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Awaiting the Verdict

THE General Election campaign is in full swing and in less than a fortnight's time the nation will have given its verdict. The simple issue for most people will be the casting of a vote for or against the National Government. The general inquest which is being carried out cannot exclude a mass of more or less relevant detail including party cries with which the country has been familiar for years, but it remains true that not since 1918 has an election been so greatly dominated by national considerations as that of 1931. Accordingly, a special responsibility rests upon every individual who has the inclination or the capacity to influence his fellows to think out exactly what the national crisis is, why it came to pass, and how it can be resolved.

A little careful thinking will show that many of the candidates have travelled far from the fundamental facts underlying the crisis. Nobody can complain of the ventilation and free discussion of tariffs, restriction of imports, quotas, guaranteed prices for home products, and all the other expedients which are being proposed as means towards the restoration of a favourable trade balance. That indeed is a vital consideration in any reconstruction of the national position and no reasonable man will rule out

of the discussion any measure which may contribute to that end, including even policies which he has found unacceptable in the past. Still, these things are not the end of the matter, as will be appreciated by anybody who takes the trouble to recall the circumstances which led to the formation of the National Government two months ago. It was not merely the need of a balanced Budget that brought about the downfall of the Labour Government. The root of the crisis was the extravagant scale on which that Government has been spending the taxpayers' money and its failure to agree upon a programme of national economy to the amount and the character necessary to the maintenance of British credit.

The Chancellor of the Exchequer has never shrunk from telling the nation in the plainest possible language that it has been living beyond its means. The National Government has taken the first step towards ensuring that the nation shall live within its means by passing through Parliament first a drastic Economy Bill and secondly a supplementary Budget imposing new taxation. It is claimed that the effect of these two measures will be to secure balanced Budgets this year and next. It should never be forgotten that, of the two measures taken to balance the Budget, the Economy Bill was invariably placed first. It was the core of the Parliamentary situation and the election programme of the chief party in Opposition is primarily based upon it. Speakers who take the view of the Opposition argue that it was on too severe a scale, but there is another and rapidly growing school of thought which thinks that the Government did not go nearly far enough. Taxation at its new level is admittedly higher than British industry can stand if it is to compete successfully with other countries in the neutral markets of the world, and there can only be fewer burdens on the nation if public expenditure is still further diminished.

It is fatally easy in the excitement of a popular election campaign to leave public economy in the background. Such a tendency is already discernible and the business community, which has suffered and will suffer most by loose thinking on the subject of public spending, must see to it that the gravest of the national ills is not ignored by those who are supporting the appeal for a doctor's mandate. The British economic fabric has been shaken to its foundations by the application of principles which can only be described as the squandering of its capital resources, without which trade cannot flourish and employment be provided. The nation can never be permanently healthy until the need of more and more public economy is burnt into the minds of its leaders. With public expenditure on a manageable scale and the application of the axe to the formidable tables of taxation, it would be possible to look the world in the face again and to say that Great Britain stands financially where it has always

stood. What are called constructive remedies will not avail in the long run if waste and extravagance are not peremptorily banished from the public services.

The Nation's Fuel Problem

DR. W. R. ORMANDY'S paper on the future development of coal, smokeless fuel and oil, which was presented at the recent joint meeting of the Institute of Fuel, with the Chemical Engineering Group, the Chemical Society, Coke Oven Managers' Association, Institution of Chemical Engineers, the Society of Chemical Industry, Institution of Petroleum Technologists and other bodies, has been described as the best compilation—as a perspective of the fuel problem—that has yet been put before the technical public. The industrial supremacy of this country has been largely built up on cheap and excellent coal, and with oil at present-day prices there is little prospect of any alteration, nor are there any signs of a shortage of oil in the near future. The fact that coal can be converted into oil has been known for a considerable time, but it was not until Bergius in 1912 demonstrated that coal could be converted by the action of hydrogen under certain conditions of heat and pressure, that the matter began to have practical importance. At present, the problem is one of political economy. It is desirable that this country should be in a position to produce its own light, volatile fuel, more especially as we do not know what will happen in the future. At the present time we are importing 10 million tons of oil annually, of which over 3 million tons come within the category of petrol, and to displace this petrol 14 million tons of coal would have to pass to the hydrogenation plant. The price of petrol has varied considerably from time to time; if imported at 5d. per gallon there is a profit of $7\frac{1}{2}$ per cent. for the oil companies. The technical problem to be faced was, therefore, the production of petrol at, say, 5d. per gallon, from coal costing 13s. to 15s. per ton delivered at the site of the plant. There is also the attitude of the Chancellor of the Exchequer to be considered with regard to the position of the petrol produced by such a process, for if the petrol produced by hydrogenation were not taxed, then under present conditions, if we assume that the first plant to be built has a productive capacity of 220,000 tons (60 million gallons) of petrol per annum, the State would lose £1,750,000 in duty.

Referring to low temperature carbonisation on a large scale, Dr. Ormandy points out that if smokeless fuel is to be produced at or near the source of the raw material, the problem of carriage will arise. Smokeless fuel occupies twice the space, weight for weight, compared with coal and the average railway truck moves slightly more than 9 tons of coal per journey. Coal, on one hand, is moved faster or slower as the demand rises or falls, and in the case of smokeless fuels it would be necessary to have either a peak load capacity or work into stock during the summer months. The storage of a light coke occupying twice the space normally occupied by coal would then raise additional difficulties, more especially as moisture has a deleterious influence on the value of all cokes, and those cokes which are suitable for use as smokeless fuel are very absorbent. Weight for weight, low temperature tar oils

are also worth less than imported fuel oils. It has therefore been suggested that such tar oils should find their only outlets in hydrogenation for conversion into petrol. Little over one-half of the hydrogen necessary to convert coal into petrol is required in cases where low temperature tar oil is used in place of coal as the raw material. In addition, it can be claimed that low temperature tar oils have many advantages over high temperature tar oils in regard to the ultimate result of the hydrogenation process.

Overseas Chemical Trade

THE Board of Trade returns for overseas trade during September show chemical exports at £1,208,740, a decline of £397,221, or 24.7 per cent. below the figures for September, 1930. Chemical imports, however, stand at £1,041,709, which is only £11,752, or 1.1 per cent. below September, 1930. Re-exports were only £47,571, a decline of £29,312. For the first nine months of the current year our decline in chemical exports and imports now totals £4,123,201 and £1,091,692 respectively in comparison with figures for the corresponding period of last year. Re-exports of imported merchandise, on the other hand, are actually £17,841 higher, taking the same period into consideration. It is too early to see the true effect of the suspension of the Gold Standard upon these overseas trade figures, but since September 21 the space which has been taken by exhibitors at the Olympia Section of the forthcoming British Industries Fair has increased at the rate of 5,000 square feet per week, whereas from September 7 to 21 (prior to the suspension of the Gold Standard) the rate of increase was only 500 square feet per week. These figures certainly reflect the improved export position.

Books Received

- PERKIN AND KIPPING'S ORGANIC CHEMISTRY. By F. Stanley Kipping and F. Barry Kipping. London: W. & R. Chambers, Ltd. Pp. 644.
- FORENSIC CHEMISTRY AND SCIENTIFIC CRIMINAL INVESTIGATION. By A. Lucas. London: Edward Arnold & Co. Pp. 324. 18s.

The Calendar

Oct. 19-23	London Medical Exhibition. 12 to 6.30 p.m.	New Royal Horticultural Hall, Westminster.
20	Institute of Fuel: Presidential Address by Sir Hugo Hirst. 6 p.m.	Institution of Mechanical Engineers, London.
21	Institute of Fuel: Annual Dinner and Dance. 6.45 p.m. Society of Glass Technology, 2 p.m.	Connaught Rooms, London. Science Museum, South Kensington.
22	Institute of Metals (Birmingham Section): Inaugural Address. Sir William Larke. 7 p.m.	Chamber of Commerce, Birmingham.
28	Institution of Chemical Engineers: Graduates' and Students' Section: "Crushing and Grinding with special reference to Ball Mills." C. A. R. Stead.	London.
Oct. 29.	British Association of Chemists: "Vat Dyestuffs—Their Application and Properties." F. Scholefield. 7 p.m.	Technical College, Derby.
31	Institution of Chemical Engineers: "Hydrogenation." Dr. E. F. Armstrong. 6.30 p.m.	Lecture Theatre of Institution of Civil Engineers, London.
30	Institute of Metals (Birmingham Section): Dinner and Dance.	Queen's Hotel, Birmingham.

The Future Development of Coal

Smokeless Fuel and Oil from the National Standpoint

By Dr. W. R. Ormandy

The following paper, by Dr. W. R. Ormandy, deals with the possibility of producing oil from coal either directly by hydrogenation or by low temperature carbonisation. It was presented at a joint meeting of the Institute of Fuel with the Chemical Engineering Group, Chemical Society, Coke Oven Managers' Association, Institution of Chemical Engineers, Society of Chemical Industry, Institution of Petroleum Technologists and other bodies, on Wednesday, October 7, the President of the Institute, Sir David Milne-Watson, in the Chair.

THE industrial supremacy of this country was largely built up on cheap and excellent coal. In 1913 we produced over 287 million tons of coal, but in the first three months of this year production was at the rate of less than 220 million tons per annum. The home demand is reduced largely by the iron and steel position, for these industries in 1913 used 31.4 million tons and only 23.4 million tons in 1929. Although the gas industry is growing steadily, the requirements for coal do not increase in the same degree owing to the great economies brought about by better design and higher yields of gas per ton of coal used. The railway demand has not varied considerably for many years, but if we are to believe those who had proposed a Diesel-electric system of traction, the Weir scheme for the electrification of main line railways would again reduce the national consumption of coal by nearly 10 million tons. Domestic use remains steady, being more dependent on the weather than other factors, and is in consequence a very seasonal trade, but general trade requirements are down, in sympathy with the general economic position.

With oil at present-day prices there is little prospect of any alteration, nor are there any signs of shortage of oil in the near future. At one time it was argued that coal dust firing would redress the balance of affairs, but this hope seems doomed to fade. It is true that coal dust of adequate fineness can be dealt with very much as can oil where used for boiler firing, with similar saving in boiler room staff, but the old problem of coaling remains with bunker trimming and the handling of the coal to the grinding machinery. Coal dust in a suitable state for boiler firing weighs 30 to 25 lb. per cu. ft., whereas a unit of space filled with oil carries 2 to 2½ times the number of heat units.

Dependency of Britain on Foreign Oils

With the exception of comparatively small quantities of benzole, produced from the distillation of coal, and the small quantities produced in the Scottish Shale industry, this country is entirely dependent upon importations for its supply of motor spirit. It is, in fact, in the same position relative to oil as are the Scandinavian countries in relation to coal. We are buyers in a more or less open and competitive market, and our supplies come from the United States, Venezuela, Persia, Russia, Roumania, East Indies and elsewhere.

Motor spirit may be divided into three classes:—(1) That produced by the distillation or topping of crude oil as it comes from the earth. This is known as straight-run petrol; (2) motor spirit produced by cracking or heating heavy oils under pressure—known as cracked product; (3) a very light variety of motor spirit obtained by the scrubbing of natural petroleum gas, resulting in what is known as casing head motor spirit. There was a time not many years ago when motor spirit prices increased, as the demand was growing more rapidly than straight-run motor spirit was being produced. It was the development of cracking processes which eased the situation. (Until to-day probably about one-third of the total world production of motor spirit is obtained by cracking.) Many straight-run and cracked spirits, however, were deficient in light boiling fractions necessary to give easy starting, and this deficiency was met by the addition of casing head spirit, which gives 70 to 79 per cent. distilling below 100° C.

The amount of motor spirit contained in crude oils varies greatly, but seldom exceeds 30 per cent. Quite recently a new oil field has been discovered in the Kettleman Hill district of California, where the crude oil can be regarded as little less than a somewhat impure motor spirit. An ordinary oil well in the Kettleman district will give nearly 1,000 tons

a day of what is essentially motor spirit, and at the same time yield 100,000,000 cu. ft. of gas at 1,000 lb. per square inch pressure, from which a further 80,000 gallons of casing spirit is extracted. New oil fields and new sources of supply are being discovered and developed more rapidly than the old fields are giving out. It would appear therefore that productive capacity will remain in excess of requirements for some considerable time, and that, as in the export coal industry, economic prices will become matters of arrangement between rival producers and distributors.

Heavy Oil, Kerosene and Gas Oil

By the distillation of coal, or by hydrogenation of coal, not only is motor spirit produced, but heavy oils are or can be also produced. A certain amount of crude oil is brought into this country, chiefly from Persia, and some of this is distilled for the separation of the motor spirit contained in it and the production of various fractions. The chief fractions obtained from crude oils, boiling at a higher temperature than motor spirit, are kerosene and gas oils, the residue in the still being sold as a fuel oil, or worked up in appropriate cases for lubricating oil.

The average kerosene has a boiling range from 150 to 300° C.; and it is still chiefly employed for burning in paraffin lamps. Such an oil cannot safely be added to motor spirit, for the high boiling portions lead to trouble in the engine; but owing to the excise duty of 6d. per gallon placed on motor spirit, there is a growing industry in the production and importation into this country of a heavy fraction coming between motor spirit and kerosene, but lying just outside the taxable limit. Such an oil would have an initial boiling point of 110° C., and an end point of about 250° C., with a flashpoint lying just over 73° F. About one-third of such oil can be mixed with straight-run and casing head spirit to yield a usable fuel.

The next higher boiling fraction is known as gas oil. It is so called because large quantities are employed in the industry of gas manufacture for the enrichment of water gas. Water gas has a thermal value of about 300 B.Th.U.'s per cubic foot, and this has to be raised to whatever standard is obtaining—generally in the neighbourhood of 500 B.Th.U.'s per cubic foot. A certain amount of gas oil is obtained from the residue which is left during the process of cracking heavy oil. Such cracked gas oil is disliked by the gas companies, it having been found difficult to get as many heat units in the form of gas out of such an oil, compared with the amount obtainable from that made from so-called straight-run gas oils. On the other hand, cracked gas oils can be put on to the Diesel engine fuel market. It has to be admitted, however, that these cracked oils, or, as they are known in the trade, re-cycle oils, are not liked by the Diesel engine users, owing to their high spontaneous ignition temperature and the consequent high pressures necessary to use them effectively.

Furnace oils may be regarded as being the outlet for all products for which it is otherwise difficult to find a market, though certain specifications have to be fulfilled, particularly for marine use, where bunker oil must have a flashpoint higher than 150° F. and a viscosity which will allow of ready pumping and adequate atomisation at the burners. The higher heat values of such oils supplied to the British Navy, under strict specification, are round about 10,000 B.Th.U.'s per lb., and the specific gravity varies between 0.895 and 0.955, these being figures which will become of importance when we are comparing home-produced fuels which it has been suggested should be employed in the place of the imported mineral oil.

Oil from Coal—Hydrogenation

Up to 1924 experimental work on the hydrogenation of coal was chiefly confined to discontinuous work with experimental bombs, although quite a large continuous plant was at work hydrogenising heavy oils. In 1924 the first continuous plant for the conversion of coal into oil came into operation. Discontinuous bomb experiments proved that the necessary pressures were of the order of 150 to 200 atmosphere, and that for the maximum conversion, temperatures of 450° to 520° C. were required.

The Bergius continuous system for the conversion of coal into oil was in essence quite simple, though the technical difficulties which had to be overcome were very great. In the first place, the coal selected for treatment was ground to about the same degree of fineness as is employed for coal dust firing. This finely divided coal in the dried state was mixed with about 40 per cent. of its own weight of the heavy oil produced during an earlier operation, and to this mixture of oil and coal dust was added the desired percentage of "luxmasse" (residue left after extracting alumina from bauxite—essentially consisting of iron oxide). After intimate mixing, this paste was pumped into a heated vessel through which hydrogen was passing under a pressure varying from 150 to 250 atmospheres, according to the nature of the work in hand. These autoclaves were externally heated by gas flames, and the contents were kept agitated by means of revolving scrapers. At the exit end of the autoclave the now comparatively thin fluid tar-like product was discharged through a valve into a receiver, where the liquid separated from the gas. Vast progress has been made since 1924 in the technique of high pressure work, but the fundamental principles employed by Bergius remain unaltered.

A number of exceedingly valuable discoveries were made with these early continuous units. It was found that coals differed considerably in the ease with which they could be converted into oil. Bituminous coals were not nearly so amenable to treatment as brown coals and lignites, some of the coaly lignites being extraordinarily reactive. It was found that experiments carried out in the small bombs—that is, discontinuously—were not in all respects to be relied upon. The reaction might not start until say 480° C. under 200 atmospheres pressure, and at 482° C. the autoclave contents might be converted into a more or less coherent mass of coke. Generally speaking, it was found that there was a wide range of coal amenable to treatment where the variations in yield were of a low order.

High Pressure Technique

It is often thought that great danger is attached to the use of these high-pressure plants, and particularly to the autoclaves which have to be heated to a temperature distinctly in the danger zone for plain carbon steels. By danger zone is meant the temperature at which the creep strength of the metal begins to fall rapidly. Now, the early Bergius autoclaves were worked under what would be now regarded as absurdly onerous conditions. In the first place, the earlier vessels were made of plain carbon steels, and when the contents of the autoclave had to be brought to, say, 500° C., the steel walls of the autoclave had to be at a higher temperature than this. After some thousands of hours of work, several of these pressure vessels gave way, but, contrary to popular expectations, this does not mean that they burst in the usual meaning of the word. What happened was that there appeared a hair-fine crack running down part of the length of the vessels, out of which the inside gas was discharged until the pressure dropped to 40 or 50 atmospheres. These cracks were so fine that they were really difficult to find after the pressure was reduced. In a modern plant use would be made of some of the new alloy steels, particularly those containing nickel, chromium and molybdenum. The yield limit of some of the modern alloys at 500° C. is from two to three times that of plain carbon steel at the same temperature. Further, under modern practice external heating is entirely done away with, and the walls of the vessel are cooler than the contents, and not hotter as was the case with the Bergius experimental unit.

The majority of English coals investigated showed conversion of the coal substance (that is of the coal less ash and moisture) of the order of 60 to 70 per cent. in one opera-

tion, though one or two coals considerably exceeded this figure. The amount of hydrogen taken up in the autoclave was, however, too small to allow of a large conversion into mineral oil-like products, and this was borne out by the nature of the product. Only 10 to 15 per cent., and generally nearer 10 per cent., of the coal substance was recovered in the form of a spirit boiling below 160° C., and the high boiling point fluid residues resembled low temperature tar in that they were rich in phenolic bodies soluble in caustic soda.

Hydrogen and Coal Requirements

To convert coal into oil necessitates the addition of some 10 per cent. of hydrogen to bring about the transformation. This means that to convert a quantity of coal into a ton of petrol at least 40,000 cubic feet of hydrogen will be necessary. No one in this country has such experience of the production of cheap hydrogen on a large scale as Imperial Chemical Industries. At the present price of coal, they can convert coal into petrol at an overall cost of 7d. per gallon of spirit produced.

Considerable amounts of coal are required over and above that passing through the autoclaves which is undergoing actual conversion. It may be assumed that for every 1½ tons of coal passed through the autoclaves approximately 2½ tons are necessary for all other purposes, including the provision of power which is used for compressing the hydrogen, grinding the coal, mixing the coal and oil and forcing the mixture into the pressure system. In addition, heat is necessary for raising the oil-hydrogen mixture to the temperature at which the reaction takes place, and still larger quantities of coal are required for the manufacture of coke from which water gas and eventually hydrogen are produced. To make 1 ton of petrol, approximately 4 tons of coal are necessary in all. Our national requirements for petrol amount at present to approximately 3,500,000 tons per annum, and to displace this, 14,000,000 tons of coal would be necessary.

It must not be assumed that in one passage through a catalyst chamber practically the whole of the coal can be converted into motor spirit. The product of the first reaction will contain oils from low to high boiling-point, and if petrol alone is desired the heavy fractions mixed with fresh coal are put through the plant a second time. It has become customary to regard the problem of converting coal into oil as being in fact essentially one of converting coal into petrol, but it has to be remembered that much larger weights of mineral oils in the form of Diesel engine oil and fuel oils are used in this country than the total weight of petrol. Fortunately, heavy oils can be produced by hydrogenation just as easily as, or more easily than, the more volatile qualities, and by variation of conditions it is possible to alter the ratio of the products within a wide range.

Quality of Oil Fractions Produced

Assuming the plant is running to produce the maximum amount of motor spirit, such average motor spirit would have an octane number of 81, which, put into more easily understandable terms, means that the spirit would be about equivalent to a mixture of equal parts of motor benzole with an average straight-run American spirit. This means that, from the anti-knock standpoint, the spirit would be as good as or better than, the spirits commercially available to-day. As the oils produced by hydrogenation are remarkably free from unsaturated products, they are easily and cheaply refined, and during refining, losses are low.

The heavier oils for fuel purposes would have a heat value more commensurate with mineral fuel oils than with the oils produced by the fractional distillation of low temperature tars, but no information is available as to their specific gravity and viscosity. As to the suitability of what might be called the Diesel engine oil fractions one question must be raised. The very property of hydrogenised petrols which makes them particularly valuable—namely, their high anti-knock properties due to their large content of aromatics and naphthenes—counts against a Diesel oil, the Diesel engine preferring a fuel having a low spontaneous ignition temperature, so that it can be worked to give self-ignition at the lowest possible compression.

Economics of Coal-Oil Industry

It is to be assumed that if the coal-oil industry is to be developed in Britain the first works would be put down some-

where in the Midlands most suitable for the supply of cheap raw material, and with a view to the cheapest possible distribution of the finished product. The production figure of 220,000 tons per annum, which has been discussed, corresponds to approximately 60,000,000 gallons, a quantity large enough to need a fair-sized distributing organisation. This raises the point as to whether the suggested unit is regarded as the smallest desirable, because, from the distribution point of view, three units for the same output would be in this respect better. No doubt this side of the subject has received adequate consideration. Obviously, the overhead costs on the larger unit would be lower, and it is well known that the cost of hydrogen production is largely bound up with the size of the unit.

In addition to the cost per gallon, interest centres on the capital outlay involved, and a figure of £8,000,000 has been mentioned. This sum is arrived at on the assumption that an entirely new works is started, and includes the cost of land and sidings, buildings and plant, bunkers and storage, and makes allowance for the reserves which are desirable, and indeed necessary, in considering the lay-out and starting of a new industry. The sum of 7d. per gallon covers depreciation varying from 15 per cent. on those parts of the plant most liable to deterioration, down to 2½ per cent. on buildings. At the present sale price of petrol, assuming 2d. for distribution charges and 2d. for the retailer, no profit can be made; but, as stated elsewhere, the present situation cannot last, and even before such a unit could be erected circumstances may radically have altered.

At present the problem is one of political economy. That it is desirable that this country should be in a position to produce its own light volatile fuel is obvious, and what is even more obvious is that the nation should have proof on a commercial scale that the problem has been solved, and that, in case of necessity, production could be increased. Assuming that the motor spirit produced by hydrogenation from coal were not taxed, then under the present conditions the State would lose £1,750,000 in duty, but an additional 900,000 tons of coal would be necessary, which would find employment for 3,000 additional miners, and obviously the provision of the necessary plant would find temporary work for many more.

Caking and Non-Caking Coals

Some coals when gradually heated in a retort leave a residue which is practically unaltered in form, consisting of particles more or less the size and shape of the particles of the coal employed. Another type softens, partially fuses, and leaves a hard coherent coke. Finally, there is the type of coal which fuses readily, and eventually leaves a more or less coherent, spongy, swollen, and very bulky coke. With some coals slow preliminary heating up to a given temperature, with more rapid heating thereafter, also affects the nature of the coke. Long standing in the air or a preliminary low temperature heating in the presence of air, also tends to convert a caking coal into a non-caking one. Of interest in this relation is the discovery made by the Fuel Research Department that if non-caking coals be heated with hydrogen under a high pressure, they are converted into caking-coals. As the coal left after treatment was found not to contain more hydrogen, it would appear that the alteration in properties was due rather to the removal of oxygen. Only in the case of anthracite coals was any gain in hydrogen found.

The higher the temperature at which a coal is distilled, the less volatile material will be found in the resulting coke. Coals which have been slowly heated to a temperature not exceeding 450° C. may give cokes containing 16 or 17 per cent. of volatiles; whereas the same coal heated to 700° C. would give a coke containing only 3 per cent. of volatiles. The strength, porosity, resistance to abrasion, ease of ignition, reactivity to CO₂ and H₂O of coke are all influenced by the temperature of formation, by the conditions obtaining during the heating, as well as by the nature of the coal or coals employed.

If bituminous coal be heated gradually in thin layers, and under such conditions that the escaping vapours are immediately removed without being subjected to a temperature greater than that at which they were evolved, a characteristic type of tar is produced known as primary tar, and the amount

of this increases as the temperature increases from 350° C. to 600° C. If a similar coal were heated in thicker layers and with more rapid temperature increment, the amount of tar produced would diminish, but the weight of permanent gas would increase and the nature of the tar begin to alter very radically. In the primary tars little or no aromatics are found, whereas the tars produced under high temperature conditions are rich in aromatics. High temperature tars are also richer in what is known as "free carbon," this being the product contained in the tars, and which is insoluble in benzole. The alteration in the constitution of the tars with increasing carbonisation temperatures is due to the cracking of the primary tars produced at the lower temperatures. The degree of cracking depends on the length of time the tar is in contact with the coke and on the temperature in the retort.

Suitability of Coals for Coking

The question arises whether the supply of coal suitable for coke-making is adequate. Undoubtedly, low sulphur coals of the best type are at a premium, and bring a higher price than coals which have to be employed in other districts for making metallurgical coke. On the other hand, there are large quantities of coals available which, if used alone, would give coke which would be either too frothy and porous or not sufficiently coherent. By mixing, or, as it is termed, blending, a strongly caking coal, or even one of the frothy-coke-making type, with non-caking or slightly caking coals, a satisfactory product can be ensured. In the Ruhr area of Germany bright and dull seams of coal are found at different levels in the same coalfield. The bright coal is of a strongly caking character, and the dull coal but slightly caking. Such bright and dull coals are blended and used for the production of an excellent metallurgical coke.

If the caking coal available be of a strongly caking character, and non-caking, or slightly caking coal with which this is to be mixed is available in larger quantity and consequently more cheaply, then the amount of the high caking coal necessarily employed in the mixture can be reduced by relatively fine grinding and subsequent careful blending. On the other hand, if the strong caking coal be available in the larger quantity, the tempering effect of the non-caking or slightly caking coal to be mixed with it can also be increased by fine grinding.

By-Products of Coke-Oven Industry

The coke-oven industry produces two further by-products, tar and ammonia. The latter was at one time regarded as an asset; to-day it is a liability, for there has recently been a large over-production of synthetic ammonia and here, as in so many industries, the capacity for production throughout the world is vastly in excess of the present demands. Unfortunately, the ammonia has to be removed, and every ton removed to-day is a distinct loss. The tar produced is of the order of 10 gallons per ton of coal carbonised. At present the most valuable ingredient in this tar is the light boiling portion sold, for the most part, as motor benzole. The quantity of this product derived from the tar is not great, but a much greater amount is obtained by stripping the coke-oven gas, or, as it is called, debenzolising it. Taking the industry as a whole, a little over 2 gallons of refined motor spirit is obtained per ton of coal carbonised. The remainder of the tar is very similar in nature to gasworks tar. The approximate amount of 34,000,000 gallons of motor benzole produced from the coke-ovens in 1929 found a ready market in the motor industry. This product of high temperature distillation of coal has a very high anti-knock value. Being produced from raw materials of home origin, it is not subject to the 6d. per gallon excise duty, and in consequence it brings a price which is exceedingly high when compared with the present import value of mineral oil motor spirit.

There are growing difficulties in disposing of the heavier fractions of the tar. On distillation, the tar is separated into heavy oils and pitch. A very large proportion of the pitch in the past has been used in South Wales, France, Belgium and elsewhere for briquetting purposes, but this market is diminishing and prices are low. Creosote oil for wood impregnation has in the past been exported in large quantities to America. It has been suggested that the surplus high boiling tar oils could be employed for Diesel engine purposes.

(To be continued.)

British Overseas Chemical Trade in September

Percentage Fluctuations for Past Nine Months

EXPORTS of chemicals, drugs, dyes and colours during September as revealed by the Board of Trade returns for British overseas trade, amounted to a total of £1,208,740, which is £397,221 lower than in September, 1930. Imports totalling £1,041,709 were lower by £11,752, and re-exports totalling £47,571 were lower by £29,312, as compared with September, 1930.

The statistics for exports and imports during each of the past nine months are set out below, showing percentage fall

or rise calculated on figures for the corresponding months of last year:—

Jan. Feb. Mar. Apr. May June July Aug. Sept.

Exports—36.5—40.5—30.5—19.4—15.4—19.0—21.5—26.3—24.7
Imports—22.7—11.3—13.2+ 4.8—16.4— 8.8—11.4—11.5— 1.1

For the first nine months of this year exports have dropped £4,123,201 and imports have dropped £1,091,692 below the figures for the corresponding period of 1930.

	Quantities		Value			Quantities		Value	
	Month ended		Month ended			Month ended		Month ended	
	September 30.	September 30.	September 30.	September 30.		September 30.	September 30.	September 30.	September 30.
	1930.	1931.	1930.	1931.		1930.	1931.	1930.	1931.
CHEMICAL MANUFACTURES AND PRODUCTS—Imports									
Acetic anhydride ... cwt.	96	197	418	580	To China (including Hong Kong) tons	2,944	706	22,083	4,336
Acid, Acetic tons	435	482	16,805	16,241	„ Japan „	—	3,517	—	18,404
Acid, Tartaric cwt.	2,505	3,540	13,580	16,077	„ British West India Island and British Guiana tons	833	831	6,002	4,851
Bleaching materials „	8,815	5,491	12,023	10,940	„ Other Countries „	22,603	8,087	157,582	43,385
Borax „	9,800	11,614	6,250	7,069	Total „	48,649	24,189	342,082	130,521
Calcium carbide ... „	84,130	57,112	49,267	35,000	Bleaching Powder (Chloride of Lime)... .. cwt.	38,876	46,890	10,801	13,376
Coal tar products, not elsewhere specified value	—	—	55,975	2,914	COAL TAR PRODUCTS—				
Glycerine, Crude .. cwt.	787	—	1,716	—	Anthracene cwt.	286	—	86	—
Glycerine, Distilled „	1,427	2,226	3,296	4,123	Benzol and Toluol galls.	5,429	6,330	547	479
Red Lead and Orange Lead cwt.	4,415	3,071	6,508	3,800	Carbolic Acid (Crude) cwt.	989	5,563	1,201	390
Nickel, Oxide „	206	—	1,079	—	Carbolic Acide (Crystals) cwt.	711	681	2,281	1,735
Potassium Compounds—					Cresylic Acid galls.	60,664	68,999	7,777	7,002
Nitrate (saltpetre) ... cwt.	7,535	4,392	6,841	4,417	Naphtha „	3,803	3,365	357	318
All other compounds „	377,787	305,241	98,002	81,850	Naphthalene (evcluding naphthalene oil) cwt.	5,561	8,003	1,319	2,022
Sodium Compounds—					Tar Oil, Creosote Oil, etc. galls.	1,094,439	3,085,019	26,426	57,833
Nitrate cwt.	46,207	2,120	22,324	903	Other sorts cwt.	14,837	4,332	10,462	3,554
All other compounds „	25,045	46,313	14,279	31,151	Total value	—	—	50,456	73,333
Tartar, Cream of ... „	2,199	2,067	9,848	7,234	Copper, Sulphate of tons	956	377	20,405	6,074
Zinc Oxide tons	947	576	24,780	11,479	Disinfectants, Insecticides, etc. cwt.	29,968	25,225	79,915	66,746
All other sorts value	—	—	208,940	283,744	Glycerine, Crude „	3,378	308	6,622	334
DRUGS, MEDICINES, ETC.—					Glycerine, Distilled ... „	10,751	7,077	26,315	16,733
Quinine and Quinine Salts oz.	56,460	153,957	4,126	10,989	Total „	14,129	7,385	32,937	17,067
Bark Cinchona (Bark Peruvian, etc.) ... cwt.	4,346	2,567	18,832	12,090	POTASSIUM COMPOUNDS—				
All other sorts value	—	—	125,745	214,472	Chromate and Bichromate cwt.	1,451	1,325	2,848	2,773
DYES AND DYESTUFFS—					Nitrate (saltpetre) ... „	786	1,414	1,535	2,445
Intermediate Coal Tar Products cwt.	157	64	1,672	674	Other Compounds ... „	2,960	6,607	11,983	8,200
Alizarine „	43	—	1,968	—	Total „	5,197	9,346	16,366	13,416
Indigo, synthetic ... „	—	—	—	—	SODIUM COMPOUNDS—				
Other sorts „	2,752	2,833	62,629	63,427	Carbonate, including Soda Crystals, Soda Ash and Bicarbonate cwt.	335,133	213,529	90,731	61,028
EXTRACTS FOR DYEING—					Caustic „	133,408	105,679	97,100	76,126
Cutch cwt.	2,640	2,003	4,980	2,956	Chromate and Bichromate cwt.	1,966	2,307	2,997	3,748
All other sorts „	2,050	2,388	7,092	8,857	Sulphate, including Salt Cake cwt.	135,349	56,194	15,335	6,899
Indigo, Natural „	—	—	—	—	Other Compounds ... „	45,731	130,822	47,960	89,412
Extracts for Tanning (solid or liquid) ... cwt.	111,600	76,600	106,765	62,132	Total „	651,587	508,531	254,123	237,213
PAINTERS' COLOURS AND MATERIALS—					Zinc Oxide tons	234	273	6,868	5,710
Barytes, Ground ... cwt.	39,088	30,265	7,707	6,091	Chemical Manufactures, etc., all other sorts value	—	—	231,581	179,210
White Lead (dry) ... „	12,163	13,884	20,135	18,225	Total of Chemical Manufactures and Products value	—	—	1,062,975	754,283
All other sorts „	125,277	101,037	139,879	124,205					
Total of Chemicals, Drugs, Dyes and Colours value	—	—	1,053,461	1,041,709					
Exports									
CHEMICAL MANUFACTURES AND PRODUCTS—									
Acid, Sulphuric ... cwt.	13,905	3,666	3,671	2,198					
Acid, Tartaric „	1,024	752	6,215	3,501					
Ammonium (Chloride Muriate) tons	457	313	7,555	5,018					
Ammonium Sulphate—									
To Spain and Canaries tons	21,998	10,708	154,397	57,555					
„ Italy „	25	192	166	1,019					
„ Dutch East Indies tons	246	148	1,852	911					

	Quantities		Value	
	Month ended September 30, 1930.	1931.	Month ended September 30, 1930.	1931.
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts	107,276	81,426	9,946	8,003
All other sorts ... value	—	—	202,074	199,831
Total	—	—	212,020	207,834
DYES AND DYESTUFFS—				
Products of Coal Tar cwt.	10,980	7,436	69,699	66,570
Others sorts	5,308	8,807	7,842	7,030
Total	16,288	16,243	77,541	73,600
PAINTERS' COLOURS AND MATERIALS—				
Barytes, Ground ... cwt.	2,024	1,736	1,075	644
White Lead (dry) ... "	1,932	1,868	3,734	3,023
Paints and Colours in Paste Form cwt.	27,116	18,933	59,934	34,744
Paints and Enamels prepared (including ready mixed) ... cwt.	36,095	28,089	116,843	81,394
All other sorts	43,024	28,471	80,839	53,218
Total	110,191	79,097	253,425	173,023
Total of Chemicals, Drugs, Dyes, and Colours	—	—	1,605,961	1,208,740

Re-Exports

CHEMICAL MANUFACTURES AND PRODUCTS—				
Acid, Tartaric, including tartrates, not elsewhere specified	142	73	929	426
Borax	81	480	49	250
Coal Tar Products, not elsewhere specified value	—	—	18	2
Potassium Nitrate (salt- petre)	64	108	87	132
Sodium Nitrate	1,036	1,245	527	594
Tartar, Cream of ... "	217	248	1,148	1,125
All other sorts ... value	—	—	29,954	13,816
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts	2,550	6,932	263	651
Bark Cinchona (Bark Peruvian, etc.) ... cwt.	627	197	6,730	1,961
All other sorts ... value	—	—	30,848	23,343
DYES AND DYESTUFFS—				
Extracts for Dyeing—				
Cutch	1,535	863	2,573	1,579
All other sorts	71	17	550	122
Indigo, Natural	2	3	68	62
Extracts for Tanning ..	1,000	1,510	1,476	1,200
PAINTERS' COLOURS AND MATERIALS				
..... cwt.	525	776	1,610	1,445
Total of Chemicals, Drugs, Dyes and Colours	—	—	76,883	47,571

Frozen Fruit Pulp

EXPERIMENTS in the food research division of the United States Bureau of Chemistry and Soils have developed a new type of frozen fruit pulp, which promises a new outlet for the fruit grower and packer, a new fruit base for the ice cream manufacturer and soda-fountain operator, and a new product for direct consumption in the frozen state. By pulping the pitted fruit, adding a sugar syrup of proper concentration, mixing it thoroughly, and then freezing at very low temperatures, chemists have developed a product with a remarkably smooth texture and full retention of the original flavour. Experiments have included peaches, apricots, plums, cherries, pears, raspberries, and strawberries.

New Welsh By-Product Works

ACCORDING to the South Wales Correspondent of THE CHEMICAL AGE there is a strong possibility that a coking by-product works will be erected at Pencoed, Mid-Glamorgan, before the end of this year.

High Temperature Carbonisation**A Survey of Recent Developments**

DR. E. W. SMITH, technical director of the Woodhall-Duckham Companies, gave a public lecture on high temperature carbonisation at St. John Cass Technical Institute, London, on Monday evening, October 12, the Chairman being Sir David Milne Watson.

In introducing his subject, Dr. Smith stated that his lecture itself inaugurated a course in coal carbonisation organised by one of the best known of our technical institutes. As one who had for some time been closely in touch with the Sir John Cass Technical Institute, he was in a position to know that the course was well conceived, comprehensive and ample for the needs of serious students who desire to be kept abreast of the times in all that relates to fuel technology. The future of the industry depended on those who have a scientific training and apply it to the problems of gas and coke production, organisation, sales, distribution, finance purchasing, and, last not not least, psychology in all its branches.

Dr. Smith then proceeded to outline the principles of coal carbonisation and traced the development of carbonising plants from the early cast-iron horizontal retort to the modern high temperature carbonising plant constructed of silica, either in the form of continuous vertical retorts, horizontal retorts, or in intermittent vertical chambers and coke ovens. He showed that the principle of carbonising coal at high temperatures by causing it to pass continuously down vertical retorts, the rate of travel being controlled by the rate at which the coke is drawn from the base of the retorts, had been so generally applied that to-day about 60 per cent. of the gas that is sold by the gas industry, made directly from coal, is produced in continuously-working vertical retorts of the various systems. Discussing the types of producers employed in heating carbonising plants, he said that it was almost universal practice to use producers of the step-grate type. They were operated on the suction gas principle, the draught being obtained from a chimney or fan (where waste heat boilers were used) placed on the waste gases coming from the settings.

Necessity for Utilising the Coke Breeze

Financially the most important factor in producer practice was the ability or otherwise of the producer to absorb large proportions of the coke breeze made by the plant. Step-grate producers can burn considerable quantities of such breeze if designed for the purpose. Serious clinkering in producers should be a thing of the past, for with sufficient grate area and a proper use of steam with the primary air, this trouble can be reduced to a minimum. Waste heat recovery was another comparatively modern step forward in connection with carbonising plants. Up to 1,500 lb. of steam could be obtained per ton of coal carbonised depending on the temperature of the waste gases going to the boilers. This heat recovery had the effect of reducing the actual consumption of coke to a figure about 7 per cent. of the weight of the coal carbonised when employing modern vertical retorts.

After referring to tar and liquor circulation and control of retort house gas producers, the lecturer then discussed the subject of benzol washing. With the advantage of the 8d. a gallon tax, carbonising engineers would be examining more closely the economics of benzol recovery. In his opinion, much more benzol washing was justified than is taking place to-day. If benzol washing was adopted, either the standard of calorific value would have to be reduced about 10 to 13 B.T.U.'s per gallon extracted, or the quality of unwashed gas made would have to be increased a like amount. So far as the coke was concerned he urged that more attention should be paid to the purchase of low-ash coal for coke production. Low-ash coals cost more but the extra thermal yield is there, and an enhanced price could be readily commanded for this coke.

Cambridge University Metallurgical Laboratory

THE vice-chancellor of Cambridge University announces that the Treasurer of the University has received through the Professor of Chemistry a cheque for £1,000 from the Worshipful Company of Goldsmiths for the better equipment of the metallurgical laboratory.

Indian Chemical Notes

[BY OUR INDIAN CORRESPONDENT.]

THE chemical industry of Bombay during the past year did fairly well. The soap factories worked at their full capacity and several new soap works were started. The pharmaceutical manufacturers also did good business. The manufacture of toilet goods is prospering and many foreign goods of this class are slowly disappearing from the market. The heavy chemical industry, however, did not improve. There are three heavy chemical manufacturing concerns in this Presidency and two of them worked at a loss. The import of chemicals during the year showed a slight rise of about two lakhs, representing increased supplies from Germany, United States and Italy, the share of the United Kingdom falling off.

Match and Oil-Crushing Industries

There are altogether 16 match factories in Bombay Presidency of which the total capacity is about ten million gross match boxes per year. The industry is doing well on the whole, though complaint is made of over-production. The Director of Industries, Bombay, is of opinion that the limit of development of the industry has now been reached. The oil crushing industry has maintained its progress well, and two new oil mills were started. There is considerable scope for the expansion of this industry, but capital is not freely coming owing to trade depression.

Experiments in New Industries

The Department of Industries, Bombay, with the assistance of the Government Industrial Chemist, is now engaged in experimenting on a small scale. One of these is the manufacture of a tallow substitute for use in mills, made entirely from vegetable sources. There are already some firms engaged in it, but they cannot produce a standard product which can be used for all kinds of work. Their process consists in partially saponifying a thick viscous oil and turning it into a solid product. The Department is therefore trying the compounding of different vegetable oils for the purpose. It is also thought that complete or partial hydrogenation of the mixed oils might give the desired product, as work on small hydrogenation plant has so far given satisfactory results.

China Clay

Another line investigated is the manufacture of China clay from crude clay, of which large deposits have been ascertained in a forest area. After refining, the clays were shown to the dealers who opined that the clay manufactured could be sold in Bombay for mill use without difficulty. From the data obtained in the laboratory, approximate costs of production were worked out, and it is estimated that the clay can be marketed at a price which will yield a reasonable return on the money invested. Further work on a semi-commercial scale has now been undertaken, and it is hoped that Bombay will soon begin to supply her own needs. The annual imports into Bombay at present amount to 450,000 cwts. valued at Rs. 13 lakhs.

Some Private Ventures

It is interesting to note that a new spirit of industry is inspiring the Indians, though ventures are all on a very small scale. During the past year a factory has been established for the manufacture of hydrogenated oil, commonly known as vegetable ghee, and the concern is now working at its full capacity. It is understood that another and larger factory is being started. Similarly several new brands of shoe polishes are being manufactured. Some firms have also started manufacturing gas mantles, for which there is now a good demand owing to the increased use of Petromax lamps.

Protection for Paper

The Deccan Mills, Poona, have submitted their case for protection to the Indian Tariff Board. They desire that the continuance of the present duty should be made applicable to all papers, with a surcharge on printing and writing paper amounting to 30 per cent. on the present duty. Considerable quantities of paper, says the memorandum, are now being imported as a cheap substitute for Indian-made paper owing to the figure of mechanical pulp content of duty-free paper being fixed too low. It is therefore suggested that the definition of newsprint should apply to paper which contains not less than 75 per cent. mechanical pulp. The Indian mills have shown considerable increase in production and the quality of the product has been maintained.

The Smoke Abatement Handbook

Facts and Figures for the Smoke Abatement Movement

THE National Smoke Abatement Society have just issued the 1931 issue of their *Smoke Abatement Handbook*. This publication, the first of its kind, is a modest attempt to give those who are interested in smoke abatement, and who may be called upon to speak or write upon it, a quantity of up-to-date information of all aspects of the problem that hitherto has not been available in small compass and in one publication. It is hoped that the various articles and statistics will serve to stimulate consideration of the question and so increase the interest in a problem that is at last becoming recognised as being of first-class economic and hygienic importance. New editions will be issued from time to time, and suggestions and criticisms are invited. The present editions include notes on the causes and nature of smoke, the quantity of smoke produced, the measurement of atmospheric pollution, ultra-violet radiation and atmospheric pollution, smoke and health, the effects of smoke upon buildings, smoke and vegetation, English and Scottish law relating to the emission of smoke, industrial smoke abatement, and the domestic smoke nuisance. A special section in devoted to smokeless fuels, where Dr. Margaret Fishenden, of the Department of Scientific and Industrial Research, writes upon low temperature carbonisation.

The Handbook is sold at 6d. post free, with reduced prices for quantities, and may be obtained from the National Smoke Abatement Society, 23 King Street, Manchester.

Duties Payable on Goods Imported into Canada

ACCORDING to a circular issued by the Department of Overseas Trade a new Order-in-Council for Canada prescribes that if a sum of less than 4 dollars 80¢ cents in Canadian currency has been paid for each pound sterling of the invoice price of United Kingdom goods, the dumping provisions of the Tariff are to apply. Dumping duty provides that in the case of articles exported to Canada of a class made or produced in Canada, if the export or actual selling price to an importer in Canada is less than the fair market value of the same article when sold for home consumption in the country whence exported, there shall, in addition to duties otherwise payable, be levied a special or dumping duty equal to the difference between the selling price for export and the fair market value.

The effect of this new Order may be illustrated as follows: If the "fair market value" for home consumption in United Kingdom (say) £100 calculated at old sterling parity (viz., 4.86 2-3rds) is 486.66 Canadian Dollars the duty on such an order at (say) 10 per cent. would amount to \$48.66. Export or actual selling price to Canadian importer at depreciated exchange rate of (say) 4.40, however, would be \$440.00, so that the excess of "fair market value" over actual selling price (being amount payable as dumping duty) is \$46.66. The importer of such an order, therefore, would have to pay import duty of \$48.66 plus dumping duty of \$46.66.

British Acetate Silk Corporation

Compulsory Winding-Up Order

IN the Chancery Division on Tuesday, October 13, Mr. Justice Eve made an order for the compulsory winding-up of the British Acetate Silk Corporation, Ltd., on the petition of judgment creditors.

Mr. Heckscher said that the petition had been before the Court since October last year and had stood over on several occasions in the hope that the company, which carried on very large artificial silk works, might be saved. Since the last adjournment the receiver put in by the bank had sold the whole of the machinery and equipment. Petitioners therefore desired a compulsory winding-up order.

Mr. Gedge, who appeared for the company, which did not oppose the making of the order, and also for 260 creditors for over £130,000 who opposed the petition, said that they had not been communicated with, but a committee which was appointed some months ago had knowledge that the company was withdrawing its opposition to the order.

His lordship: You have had a much longer innings than I should have given you—fifteen months. There will be the usual compulsory winding-up order.

From Laboratory to Works

Problem of the Colour Industry

In the course of his paper on the "Transference of Colour Processes from Laboratory to Works," read before the Manchester Section of the Oil and Colour Chemists Association, on Friday, October 9, Mr. J. Barker dealt with many interesting points which have hitherto received but little publicity.

INTRODUCING his subject Mr. Barker said there were few raw materials whose composition could be taken for granted but, fortunately, analysis was by no means necessary in every case as small inconsistencies could in many instances be rectified during actual bulk use of the materials if properly controlled. There was one raw material of first-class importance which was much too frequently ignored. Large quantities of water were used in all laking processes; the usual concentrations of dyes used were anywhere between 5 and 0.5 per cent. If a barium lake of a pigment dyestuff were being made it was often found that there was in solution in the water in the case of a 1 per cent. suspension of dye sufficient calcium to precipitate between 5 and 10 per cent. of the dye as calcium salt, the actual amount varying with the molecular weight of the dye. This calcium was sufficient to show a definite difference in shade in the case of barium lakes of a bright scarlet shade, when the calcium lakes were much deeper in tone as compared with a lake made in water free from calcium. Laboratory and works water supplies were frequently from different sources, and usually the laboratory supply was the better. It was therefore advisable to use works water in the laboratory but, at the same time to ensure that it was of satisfactory quality.

There was no reason why such bases as alumina, blanc fixe and such similar bases should not be as bright and clean in appearance as those prepared in the laboratory. This was a matter of great importance in the production of pale, bright shades. The presence of traces of iron and, less frequently, other metals in works practice often had deleterious effects unlikely to be encountered in the laboratory. Iron might find its way into works batches through water pipes, open steam pipes, whether of iron or lead, or as scale from pipes over vats. Commercial hydrochloric acid sometimes contained iron, which had a very marked effect in the manufacture of paranitraniline reds, helio reds, and alizarine lakes. Fortunately, there were on the market various kinds of inert alloys which might be used to replace iron in constructional work, and lead was usually satisfactory for steam pipes, coils, and run-offs. Iron-free acid could also be obtained. It had been stated that wooden vats were unsuitable for certain amino compounds, but, said the author, he had never experienced any difficulty in that respect, even where the base had been boiled for prolonged periods in water in contact with wood.

Proportions of Reacting Materials

Regarding the proportions of reactants, accurate weighing of standardised materials was also essential, but in some cases mere weighing was not sufficiently accurate. In the case of colours which were particularly susceptible to small changes in the pH value of the liquor it was essential that before works batches were made the correct pH value should be determined, and also the effect of variations of it in either direction. When this had been done some device should be used to ensure that in manufacture the pH value did not vary much from the optimum condition. Buffers were often used in the manufacture of pigment dyestuffs to achieve this. In processes where hydrochloric acid or other mineral acid must be used and yet finally no mineral acid must be present, sodium acetate may be employed to raise the pH value to a figure nearer neutral and ensure that no mineral acid was present to prevent the required reaction or to affect the colour deleteriously. Coming to the question of concentration, it was pointed out that the only difference likely to occur between the laboratory and the works was in the case of open steam pipes where condensation of steam lowered concentration. Closed coils were the obvious remedy where it was important that concentration should not be lowered during heating or boiling. It was convenient for ease in working to have all vats and tanks and even filters numbered and calibrated. Where accurate measurement of liquids was essen-

tial it was preferable to use high narrow tanks which might be fitted with graduated sight glasses and so duplicate the laboratory process of titration in a parallel manner. Some stock solutions might be dealt with in this way with advantage, as it avoided much analysis, and was more accurate, cleaner, and less tedious than a large number of separate operations which would otherwise be necessary.

Influence of Time Factor

The time factor varied, perhaps, more than any other as quantities of materials varied. A process which, in the laboratory, might require only three or four hours to complete was often a week or more in process on the works. Every works operation—dissolving, precipitating, boiling, filtering, washing and drying took more time than in the laboratory, and any fault due to variation of other factors was for this reason liable to become more pronounced. In some cases processes were devised in the laboratory to give a particular shade under conditions where the pH of the solution was such that complete coupling could not take place, and it was therefore extremely difficult to repeat these in bulk unless small batches were made and dealt with with the same rapidity that they were in the laboratory. Again, the difference in time taken to mix two solutions might lead to differences in the finished pigment.

On the subject of washing and filtration, the author said it was the practice in some colour works to wash precipitated colour lakes by settling and syphoning the top liquor. The number of washes was usually specified, but this method was very indeterminate and might not give a product which was identical with a laboratory sample from the point of view of soluble salts. The percentage of the paste after filtration naturally affected the proportion of soluble salts present unless the material had been washed free in the first instance. It was a fact worth noting that the presence of inorganic salts often prevented bleeding in water and, strangely enough, even in organic solvents such as were used in cellulose finishes. Fine particles of foreign matter were often found in intermediate products, especially sulphonic acids, and whilst filtering through paper removed them the usual works methods did not, and the shade of the finished colour was found to be more or less dulled in consequence. There was now on the market, however, a suitable filter for dealing with problems of this kind. It employed paper as a medium and used the principle of edge-filtration. It was extremely efficient and was even capable of removing certain dyestuffs from solution. The difference which a refinement such as this made to the shade of a pigment was quite marked in some cases, but in others it was not at all necessary.

Use of Dispersing Agents

The use of dispersing agents in colour making frequently lead to more serious discrepancies than were caused by the factors already mentioned. Such agents had a very pronounced effect on the physical state and, further, this effect in many cases appeared to be most irrational. Under such conditions, a number of dye-stuffs appeared to assume a colloidal condition which was very easily upset, and being thus unstable produced inconsistent results. Some dyestuffs formed gels in water and these exhibited the same unstable properties without the addition of dispersing agents. Certain acid maroons were a case in point. A cold solution of some dyes of this type formed a bright full shade and otherwise had desirable properties. After a time the lake became dull and dirty in shade, exhibited a crystalline appearance, and was weak. This change took place much more rapidly in bulk and was difficult to prevent. If, in the dye solution, freshly precipitated alumina hydrate was first incorporated a certain amount of adsorption occurred and if the dye was then immediately precipitated a much more stable lake resulted. The time factor here was of great importance, a few minutes delay in precipitation giving rise to the poor

quality lakes already mentioned. It would appear then, in the case of such dyestuffs or similar systems produced by the addition of dispersing agents, that other factors—temperature, agitation, and so on—intensified and accelerated any tendencies to go “off” the required shade. It was possible that the foregoing accounted for the popularity of dissolving acid dyes in alum solution, running in alkali, and then barium chloride. The dyestuff was then adsorbed more easily by the alumina.

Technical Way to Prosperity

Dr. Mouat Jones's Claim

At the Manchester Municipal College of Technology, 142 students were recently presented to the Principal (Dr. Mouat Jones) for the associateship of the College, which also conferred honorary associateships upon Lord Eustace Percy and Mr. Karl Baumann.

In the course of his address, the Principal said: “We may talk *ad nauseam* of tariffs and wage-costs and rationalisation and salesmanship, but one fundamental factor always remains. Given a Utopian and competing world in which there is a fair field and no favour, in which there are neither tariffs nor wage differences, and every industry is rationalised to the last gasp, which country will be, competitively, the most efficient?—Beyond argument that one whose industry can commend the best brains, the most efficiently trained recruits and the highest technical skill.”

Dr. Jones said that he felt strongly that the question of the immediate development of the facilities for technical and scientific training in this country—he did not refer especially to the Manchester College—was, notwithstanding the financial conditions, not one which could or ought to be settled by mere references to the obvious fact that any such development would cost money. To those whose faith in the value of technical education fluctuated with the financial state of the country he did not address himself, but for those who firmly believed that the training of an industrial personnel was one of the vital essentials to the permanent recovery of our industrial prosperity, this was the very time not only for affirming faith but for remembering the saying, “Faith without works is dead.”

German Plant Manufacturer's Jubilee

Zahn and Co., of Berlin

THE firm of Zahn and Co., Ltd., Darmstaedter Strasse 8, Berlin, W.15, well-known in the chemical industry, celebrated the 50th anniversary of its foundation on October 1. Under the name of “Civil Engineer Fr. Zahn” the father of Dr. phil. Oskar Zahn, principal partner and actual technical director, founded a technical office in Dresden. In 1899 the firm was transferred to Berlin, where Fr. Zahn died in 1904. It then passed into the control of Dr. Zahn, taking the form of an open partnership and was, in 1921, converted into a limited company as “Engineer Zahn Technical Office” and later as “Zahn and Co., Ltd.” The management of business affairs since 1921 has been in the hands of the second partner, Dr. Scheel.

During the whole of the time the firm has been in existence it has devoted itself to the construction of chemical plant, mainly for the manufacture of sulphate hydrochloric acid, sulphate of soda, caustic soda, zinc white, etc., such plants being characterised by the excellence of the method of heating of the furnaces. For more than 10 years they have also constructed complete plant for the manufacture of carbon disulphide, synthetic acetic acid, cellulose acetate and bichromate. They have further succeeded in achieving considerable progress in the construction of modern crystallisers, tube evaporators and atomising dryers. In England, Zahn and Co. are represented by L. A. Mitchell Ltd., of Harvester House, 37 Peter Street, Manchester.

British Association of Chemists

THE Annual Dinner of the British Association of Chemists will be held at the Palace Hotel, Bloomsbury Street, W.C.1., on Saturday, November 28, when it is hoped that members will make a special effort to attend. Tickets 10s. 6d. (exclusive of wine) may be obtained from the General Secretary, British Association of Chemists, Empire House, 175 Piccadilly, W.1. A dance will follow the dinner.

Automatic Temperature Regulation

New Regulating Device operating on Compressed Air

AN automatic temperature regulator, suitable for controlling the temperature of tanks, pans, ovens, kilns, vulcanisers, chambers, etc., whether heated by steam, gas or hot water, has been introduced by Negretti and Zambra, 38 Holborn Viaduct, London, E.C.2. It will maintain the temperature of processes within very close limits without attention. Compressed air is employed as the operating medium as it is efficient and reliable in use, is absolutely non-corrosive and non-wearing in regard to the parts of the control mechanism and is practically unaffected by varying conditions of temperature. Compressed air, moreover, is already available in most plants for various industrial purposes, and the cost of the small quantity used in the control system is practically negligible. The air pressure required is 15 lb. to the square inch. Where a supply at higher pressure already exists, this may be easily tapped, a suitable reducing valve is supplied to maintain correct pressure. The control element consists of a complete Negretti and Zambra patented thermometer system comprising the sensitive bulb which is fitted into the tank or oven and connected by capillary tubing to the Bourdon tube movement, which is mounted in the controller. This Bourdon tube movement governs the supply of air to the valve controlling the steam or gas supply. A pointer is fitted to this movement and shows the present temperature on a graduated scale. The adjustment of the temperature at which the controller is required to operate is effected by means of the milled head placed outside the case. This is connected by means of a spindle to an adjustable plate carrying the index setting pointer and setting adjustment for the leak valve. The control can be adjusted to give a fine throttling action, thus avoiding the periodic peaks of temperature such as occur with the “on” and “off” control valve action with the usual type of thermostat. The amount of compressed air used is less than $\frac{1}{2}$ cu. ft. free air per minute.

Chemical and Dyestuff Traders

Contracts with Foreign Suppliers

A SPECIAL meeting of the Executive Council of the British Chemical and Dyestuff Traders' Association was held on Wednesday, October 7, to consider the difficulties experienced by members through the depreciation of the pound sterling.

After the situation had been reviewed from every aspect, the following resolution was passed:—

“It is the unanimous opinion of this Council that all contracts, whether in sterling or in foreign currency, made previous to the suspension of the Gold Standard must be fulfilled.”

Members of the Association are invited to give the secretary the names of any foreign suppliers refusing to meet their obligations owing to the depreciation in British currency.

Functions of the Works Metallurgist

THE Birmingham Metallurgical Society's opening meeting of the session was held at the Chamber of Commerce, Birmingham, on Thursday, October 1, when awards for students' papers were given to Mr. A. A. Timmins, who wrote on progress in the development of corrosion-resisting steels, and Mr. H. F. Allwood, whose paper was on the separation of aluminium and magnesium. The presidential address of Mr. W. F. Brazener dealt with the functions of the works metallurgist. It was probable, he said, that the position to-day was a development from the old works analyst. From the time the raw material entered the works until it left in its fully-factored state, the metallurgist must be satisfied that the treatment of the metal or alloy was carried out in accordance with sound metallurgical practice. It might be said that the first function of the works metallurgist was to ensure complete examination of the raw material as it arrived in the works. The natural sequence to that was the making up of the charges for melting. Direct personal contact between the works metallurgist and the operative, he said, could not be too strongly stressed. All the functions of works routine had one main object—the quality of the final product.

Acid Sludge as Oil Refinery Fuel

Recent Developments in the United States

PRODUCTION and consumption of acid sludge at petroleum refineries increased in 1930, according to returns just completed by the United States Bureau of Mines, Department of Commerce. The gain in the use of this material as a refinery fuel was greater than the increase in output, indicating a tendency towards more complete utilisation. It is estimated that 4 per cent. of the total heat units utilised at oil refineries is now supplied through the burning of acid sludge. While this percentage indicates that acid sludge is only of minor importance as a refinery fuel, many refiners have found it economical to instal the special burners necessary to handle this material. These refiners not only effect a saving through the heat units obtained, but are enabled to dispose of a waste product, which in the past has generally been regarded as a necessary evil and dumped into pits.

Acid sludge is a material resulting from the use of sulphuric acid in treating various refined products. Its composition is exceedingly complex and varies considerably, depending on the nature of the oil treated, the strength of the acid employed in the treating process and the technique used. It is produced both in the treating of light refined products (such as gasoline), and heavy products (such as lubricating oil). In general, the acid sludge produced in treating the light products contains a relatively low percentage of tarry matter, and from the standpoint of volume is relatively unimportant as compared with the more viscous sludge obtained from the treating of lubricating oils.

In many cases particularly where the output is small, the sludge is turned into a pit and no further attention is paid to it. At some plants the sludge is conveyed directly to the burners and is used as fuel with no attempt to separate the acid. This practice is only followed where the plants are isolated as the fumes from the stack contain a high percentage of sulphur dioxide, with some sulphur trioxide. The acid in the sludge may be neutralised before burning by the addition of a caustic, but the additional expense limits the application of this method. The major portion of the acid sludge produced is, however, treated for acid recovery. This may consist only of separating the free acid by settling, but it usually involves the use of considerable equipment, such as lead-lined tanks, where the acid is washed out with warm water and drawn off. The sludge left in the tanks is then pumped out while hot and in the majority of cases it is blended with fuel oil before burning.

Difficulties Encountered

Preventing the sludge from congealing in the pipes is regarded as the greatest difficulty encountered in burning heavy acid sludge. However, if the sludge is kept hot, there is very little danger of its becoming too viscous to handle. Considerable progress has been made in the design of equipment for the handling and burning of acid sludge. The first attempts to use acid sludge as a refinery fuel ended disastrously because the acid corroded the linings and grates. The real impetus to the use of this fuel began with the development of the rotary burner and the use of acid-resisting metals. Rotary burners have been developed to utilise all grades of acid sludge from the thin sludge produced from the treating of gasoline to the solid material dug out of storage pits. Information supplied by the companies indicates that acid sludge varies widely in heat content but averages approximately 4,500,000 B.Th.U. per barrel. Using this factor, the amount of sludge burned at refineries in 1930 yielded about 4 per cent. of the total heat generated.

Flood-lighting the Wellcome Works

IN connection with the Faraday Centenary and during the period in which the meetings and celebrations in honour of his memory and achievements were being held that portion of the Wellcome Chemical Works, Dartford, Kent, which is situated on the water front, was illuminated by flood-lighting. The long frontage and the construction of these buildings were very favourable to this form of illumination, which was rendered additionally effective by the reflections in the water. There is a direct connection between the brilliant work of Faraday and the concentration of powerful illuminants used in flood-lighting.

Society of Public Analysts

Elections to Membership

AN ordinary meeting of the Society was held at the Chemical Society's Rooms, Burlington House, on Wednesday, October 7, the President, Dr. J. T. Dunn, being in the Chair.

Certificates were read for the first time in favour of Charles Hubert Francis Fuller, B.Sc., F.I.C., Ganesh Chandra Moitra, B.Sc., Eric Charles Wood, B.Sc., A.R.C.S., Robinson Pearson Wood, M.Sc., F.I.C. Certificates were read for the second time in favour of Raymond Merefield Edwards, B.Sc., Llewelyn John Howells, B.Sc., Donald Neil McArthur, D.Sc., Ph.D., F.I.C., F.R.S.E., James Sword, M.A., B.Sc., Ph.D., A.I.C. The following were elected Members of the Society:—George Brown, A.I.C., Charles Loudon, B.Sc., A.I.C., Charles Percy Money, B.Sc., F.I.C., Martin Priest, F.I.C., Arthur Goodyear Simpson, M.A., Gerrish Smith.

Abstracts of Papers

In his paper on the identification of wood and wood charcoal fragments, Mr. J. Cecil Maby discussed the economic and forensic importance of distinguishing between different woods by their microscopical structure. The methods used in preparing the materials and for examining and identifying the sections were described in detail. The examination of dyed leathers in cases of alleged dermatitis, was discussed by Messrs. T. Callan and N. Strafford, who outlined the possibility of applying to dyed leather the tests used by Cox for the detection of diamines and allied bodies in fur. It has been found that the tannins in leather may interfere with many of these tests, but that four of them will enable definite conclusions to be drawn provided that control tests are applied to portions of the extract from the leather, after the addition of very small amounts of a *meta*- and *para*-diamine respectively. The determination of chlorides in dairy products and biological material was the subject of a paper by Mr. W. L. Davies, who described the advantages of a wet (nitric acid) method and made suggestions for obtaining a sharper end-point in the titration of the excess of silver nitrate. This method, being rapid and accurate, can be used as a check on sampling, and for determining the volume of a precipitate in certain cases.

I.C.I. Dyestuffs for Turkish Carpets

THE brightly-coloured hand-woven carpets exported from little villages in Turkey are now dyed with I.C.I. dyestuffs. Imperial Chemical Industries (Levant), Ltd., through its selling office at Haifa and its newly-opened offices in Smyrna and Mersina, is in touch with the local dyers in these villages of the interior of Turkey, who are beginning to realise the quality of their products. On a recent tour of Northern Turkey the representative of I.C.I. (Levant), Ltd., visited a number of the more important of these craftsmen, whose workshop, studio and factory are usually all housed together in one very dark little room. Photographs taken on this occasion are reproduced in the October issue of *I.C.I. Magazine*.

Chemical Manufacturer in Voluntary Liquidation

THE statutory meeting of the creditors of R. F. Macdonald and Co., chemical manufacturers, Manchester, was held on October 2, at the Chartered Accountants' Hall, Spring Gardens, Manchester. The statement of affairs showed ranking liabilities of £3,426, including trade creditors of £1,076, and bankers £1,764. The assets totalled £788, including doubtful and bad debts £559 (estimated to produce £150) and surplus from fully secured creditors £575. It was reported that the company was registered in 1925, the issued capital being £2,600, of which £1,600 was subscribed for in cash and the balance was allotted in payment of the goodwill, etc., acquired. The last accounts were prepared as at February, 1930, when there was a debit balance on the profit and loss account of rather more than £70. Since that date business had been carried on at a loss, and efforts had been made to reconstruct the company and introduce fresh capital, but without success.

A resolution was passed confirming the voluntary liquidation of the company with Mr. H. E. Garstang, of Manchester, as trustee, with a committee.

A New Conception of Leadership

Forty-Sixth Individualist Luncheon

A PLEA for a new conception of leadership was made by Sir Ernest Benn at the forty-sixth Individualist luncheon at the Hotel Victoria on Wednesday, October 14. The chair was taken by Viscount Leverhulme.

When they had arranged that luncheon, said Sir Ernest, no one had known that it would be held in the middle of an election campaign. He knew they would be disappointed if he said anything that would tend to complicate the "simplicity" of the issues before them. By a strange coincidence, the last time he had spoken to them was just before the General Election, two and a half years ago. He had then taken as his text a sentence from Lord Bryce: "The successful working of a democratic system depends on the existence of two parties and no more." Since those days, two and a half years ago, they had moved a little nearer to the ideal. What was needed to-day was absolute stability, security, and confidence, and this had been impossible to maintain amid the confusion which resulted from the existence of so many parties. He was a believer in democracy and he believed that there were thirty million electors capable of giving a sensible answer "yea" or "nay." But they were not capable of picking their way through the confusion and complications brought about by the existence of more than two great groups.

Industry Crippled by Taxation

The next question, said Sir Ernest, was this: Was leadership to be the expression of mob madness and mass misunderstanding, or was there a higher conception of it? The question could be applied in another field. In many ways politics and the Press could be considered side by side. The politicians needed millions of votes, and the Press needed millions of readers, or, at least, it thought it did. Both had the same temptations. To achieve success, you appealed to the lowest instincts in mankind, went one lower, and became a millionaire. If they examined the pages of the popular sheets, they could imagine what the office rules were—to follow trouble and make it worse, if it gave them good copy. So it was in politics. They talked about a bankers' ramp, but they forgot that they had crippled, bound and gagged industry with taxation and interference until the poor thing would hardly function at all.

Four Points to Think Over

What was badly needed was a new conception of leadership. The Individualist luncheons were far more important and exercised a far more real influence than political discussions. Literature and the drama depended to a large extent on criticism, and in the same way the sanity of politics depended on discussion which was free from party limitations. Sir Ernest said he would go down to his grave immensely proud that he had discovered the word "Individualist." But that was only the beginning. They would remember that it was a year ago that the word "economy" was first mooted at that table. It received a good deal of criticism, and it was regarded as entirely unwise to talk about economy when the Conservatives were boasting of the money they had given away. But last January the bookshop had promoted a City demonstration which had proved to be a subject for pride. He would like, in conclusion, to leave them four points to think over. The first was that public assistance should be a disqualification for a vote; the second, that the folly of the fixed price notion should be exposed; the third, that the relative merits of direct and indirect taxation should be reconsidered; and the fourth point could be summed up in five words: "Do not spend your children's income." He thought that many would find, if they examined their accounts, that they had already allocated the income of their grandchildren.

Lord Leverhulme said they all knew how much Sir Ernest had done for the Individualist Movement. They had read Sir Ernest's book "Account Rendered," and they would agree that if there was anyone who could now sit back in his armchair and say "I told you so," it was Sir Ernest Benn. But he was not that kind of man, and they would look to him for more advice and help in the future.

A vote of thanks was proposed by Mr. Harold Cox, and seconded by Sir George Buchanan.

Scottish Coal Products Ltd.

Petition in the Companies Court

IN the Companies Court of the Chancery Division, on Wednesday, October 14, Mr. Justice Eve granted a week's adjournment of the petition by John Archibald and Thomas McCracken, trading as the Gorehill Coal Company, of Arden Colliery, Plains, near Airdrie, for the compulsory winding-up of Scottish Coal Products, Ltd. It was stated that the petitioners were judgment creditors for some £5,000, and an order had been made in the Scottish courts.

Mr. Wynn Parry, for the respondent company, said until last Friday the directors believed that the petitioners would ask for the petition to be dismissed, as arrangements had been made which, however, depended on one of the chief shareholders giving a cheque which the petitioners were willing to accept.

His Lordship: Do you say that the petitioners are willing to accept a piece of paper in account of their debt? They are Scottish gentlemen, I believe.

Mr. Parry said he wanted an adjournment so that the directors could see the petitioners personally. The company, he added, was not hopelessly insolvent. His Lordship then granted the adjournment.

Tar in Road Treatment

Publicity Film of British Road Tar Association

OVER 150 surveyors from London, Middlesex, Surrey, Kent, Sussex, Buckinghamshire, Bedfordshire, Hertfordshire and Essex, saw a talking film entitled "From Coal Mine to Road," produced by the British Road Tar Association, and shown at a luncheon at the Hotel Metropole, at which Mr. Reginald G. Clarry, chairman of the British Road Tar Association, presided.

This film shows tar being produced in Britain from coal drawn from coal mines in England, Scotland and Wales. One of the principal economic reasons for the use of tar is that both tar and stone are available locally and transport costs are therefore reduced to a minimum. There are, indeed, few districts in this country where tar and stone suitable for road work cannot be obtained near at hand. Many roads prove unsatisfactory owing to faulty methods of construction. For the correct surface treatment, tar of good quality, complying to specification, is laid evenly with large sized chippings between half inch and three-quarter inch gauge; sand should never be used. Whilst the tar is still soft and tacky these chippings should then be lightly rolled, which ensures that they will be held in position to form a permanent mosaic surface which will not wear smooth.

The proceedings terminated with a hearty vote of thanks to the Association for a most interesting and informative film, which was proposed by Mr. H. T. Chapman, county surveyor of Kent, and seconded by Mr. E. J. Elford, borough engineer and surveyor of Wandsworth.

Trade Publications

A NEW CATALOGUE of scientific apparatus and chemicals has been published by J. W. Towers & Co., Ltd., the well known laboratory furnishers of Victoria House, Widnes. This catalogue extends to some 420 pages and is fully illustrated throughout. It covers the complete range of apparatus called upon for use in the laboratory, including modern balances, optical instruments and special testing apparatus, for oil, tar, milk and gas analysis. The laboratory glassware included is of the latest design dictated by modern methods of analytical technique. J. W. Towers & Co., Ltd., were established in 1882, and are contractors to H.M. Government, the Colonial Offices, London County Council, etc. They have a branch house at 134 Brownlow Hill, Liverpool.

A TRULY VOLUMINOUS CATALOGUE of chemical and industrial laboratory apparatus has been issued by A. Gallenkamp & Co., Ltd., who are scientific apparatus manufacturers and complete laboratory furnishers, with showrooms at 17-29 Sun Street, Finsbury Square, London, E.C.2. This catalogue is the 9th of its series, and extends 1,471 pages, which are illustrated throughout. Included is a section on fine chemical products for laboratory use, analytical reagents, standard stains and indicators, which are all manufactures of British Drug Houses, Ltd.

From Week to Week

AFTER 32 YEARS' SERVICE, Mr. T. Holman, engineer with Imperial Chemical Industries, at Nobels Regent Factory, Linlithgow, has retired and has received a presentation.

ACCORDING to the *Journal of Commerce*, certain departments of du Pont Co. are understood to be producing satisfactory sales results, but the majority of the divisions are operating below 1930 levels. Third quarter profits of the company are expected to be equal to about \$1 per share.

SIR LEONARD LYLE, chairman of Tate and Lyle, Ltd., states that Mr. Geoffrey Fairrie has been elected to a seat on the board as from October 1. Mr. Fairrie took an active part in the management of Fairrie and Co., Liverpool, up to the time his company was taken over by Tate and Lyle in August, 1929, and he has continued to do so during the last two years.

FURTHER CHANGES are announced in the Board of Cosach (Compania de Salitre de Chile), His Excellency Don Enrique Villegas having been appointed director representing the Senior "A" shares, in place of Fr. R. C. Edwards, resigned. Senor Villegas represents the Chilean Government on the Board of the Chilean Transandine Railway, of which he is chairman.

A FIRE OCCURRED at the chemical works of Wood and Bedford, Kirtall Road, Leeds, on Tuesday morning, October 13. The fire started in a colour drying oven, and by the efforts of the brigade, was confined to a small brick dye-house. The damage is estimated at £2,000. The firm has been busy lately, overtime being worked, but the fire will not seriously interfere with business.

THE SOCIETY OF GLASS TECHNOLOGISTS will hold their first meetings of the Session in the Science Museum, South Kensington, on Wednesday, October 21. Arrangements have been made for members and their friends to have dinner together at the Whitefriars Restaurant, near South Kensington Station, at 6.15 p.m. The presidential address will be given by Edward Meigh at 8 p.m., his subject being "The Future of Glass Melting."

FIVE MEN narrowly escaped death when a 30-foot wall of a building they were demolishing suddenly caved in and buried them at Baxter's Chemical Works, St. Helens, on Thursday, October 1. A plank which they were using as a lever against the wall bore the full force of the falling bricks, and the men were rescued and removed to hospital. The works concerned were formerly owned by the United Alkali Company, but are now the property of the St. Helens Corporation.

RECENT WILLS include:—Mr. Ernest Lunge, of 4 Albert Court, Kensington, S.W., formerly of 24 Hanover Square, barrister-at-law and scientific expert, towards the end of the war closely associated with Courtaulds, first president of the Bureau International pour le Standardisation des Fibres Artificielles, son of Professor George Lunge, Rector of Zurich University, a distinguished authority on chemistry, £5,031 (net personalty £2,964).

TESTS CARRIED OUT by the Admiralty on liquid fuel produced by the process of low temperature carbonisation developed by Motor Fuel Proprietary, Ltd., have proved satisfactory, and the Company has now been requested by the Admiralty to supply bulk samples to enable trials under service conditions to be undertaken. The Directors have taken the necessary steps for financing an immediate expansion by the creation of debentures with a fixed 5½ per cent. interest payable quarterly.

THE BRITISH DYESTUFFS CORPORATION, LTD., Dalton, Huddersfield, have been fined £5 with 5s. costs by the Huddersfield Stipendiary Magistrate, for a breach of the Chemical Works Regulations, 1922. The allegation was that an employee of the firm entered a still where there was reason to apprehend the presence of a dangerous gas or fumes, before a responsible person had personally examined the still and certified that the still was free, or not free, from danger. Mr. J. D. Gaton Smith, defending, said that what had happened was that somebody who ought to have told somebody else failed to make the communication. Hence no certificate as to the state of the still was obtained.

THE LONDON SECTION of the British Association of Chemists held a smoking concert at the Broad Street Station Restaurant on Friday last, October 16. Mr. H. M. Morgan presided.

A DECISION THAT BELGIAN IMPORTERS of British coal should be given licenses to import 76 per cent. of their imports in 1930 was reached at a meeting held in Brussels on Monday, October 12, under the auspices of the Mines Department.

THE SAFEGUARDING OF DYESTUFFS was advocated last week by Mr. J. S. C. Reid, National candidate for Stirling and Falkirk Burghs, when he opened his campaign at Grange-mouth.

FOLLOWING THE PROTEST MEETING of the Lautaro Nitrate Co. Preference shareholders, held last month, at which complaints were made of the actions of Guggenheim Brothers in relation to Cosach, a group of British and French shareholders in the Lautaro Company have issued an announcement which is being sent to the Chilean Minister of Finance.

DR. WARMBOLD, who is a director of the German Dye Trust, has been appointed Minister of Economics in the New German Cabinet. Efforts to persuade other prominent industrialists, such as Dr. Voegler, of the Steel Trust, and Herr Schmiz, of the Dye Trust, to enter the Cabinet, failed because of the disinclination to become Ministers for a short period.

MR. H. F. GURNEY, H. M. Trade Commissioner in Newfoundland and the Maritime Provinces of Canada, is now in this country on an official visit. He will be available at the offices of the Department of Overseas Trade during the period October 19 to 23, to interview manufacturers and merchants interested in the export of British goods to Newfoundland and the Maritime Provinces.

A MEETING OF THE NOTTS AND DERBY SECTION of the British Association of Chemists will be held at the Derby Technical College, on Thursday, October 29. The chair will be taken at 7 p.m. by Mr. J. F. Briggs, when Mr. F. Scholefield, of the Manchester College of Technology, past president of the Association, will lecture on "Vat Dyestuffs: their Application and Properties."

A LARGE NUMBER OF PEOPLE, mainly women and girls, were injured—one fatally, and 38 to the extent of requiring treatment at Batley Hospital—by an explosion which occurred on Tuesday, October 13, in the economiser plant of T. Burnley and Sons, Ltd., worsted spinners, Gomersal Mills, Gomersal. No official estimate of the damage is available, but it is suggested that it will not be less than £15,000. Some 1,100 operatives are employed at the mills, which were entirely closed down following the explosion, and 600 workpeople will be thrown temporarily out of employment.

THE LEAGUE OF SCIENCE has opened a general list for scientific workers who desire to become Parliamentary candidates in the future; and in this direction it is already in touch with more than one of the political parties in this country. It is also organising a science committee to advise one of these parties on industrial affairs. The list of honorary membership of this League is now open for those with scientific qualifications; reference should be made to the Hon. Secretary, League of Science, 27 Willow Road, London, N.W.3.

AN EXHIBITION illustrating the most striking developments of recent researches in glass technology, organised by the Society of Glass Technology in conjunction with the Glass Research Delagacy, is to be held at the Science Museum, South Kensington, S.W.7., from October 22 to December 31, Sundays included. This exhibition which will be formally opened by Sir Richard Gregory at 4 p.m. on Wednesday, October 21, is being arranged to cover the various advances which have been made during the past 15 years in glass for optical, illuminating, electrical, mechanical, chemical, heat resisting and artistic purposes. Jointly with this exhibition, a series of weekly lectures will be given in the Science Museum, the first lecture being on Thursday, October 22, at 4.45 p.m., when Professor W. E. S. Turner will deal with "Modern Artistic Glass."

Obituary

HENRY EDWARD PURKIS, chairman of Hepworth, Ltd., chemical manufacturers, Kidderminster, in his 81st year.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Accepted Specifications

- 351,264. HYDROCHLORIC ACID. Chemische Fabrik Kalk Ges., and H. Oehme, 1 Kalker Hauptstrasse, Kalk, Cologne, Germany. International Convention date, April 22, 1930.

Vapours containing hydrochloric acid are treated with sulphates, of copper, lead, or cadmium to form addition compounds, from which concentrated hydrogen chloride may be obtained by heating.

- 351,271. POTASSIUM NITRATE AND AMMONIUM CHLORIDE. Chemieverfahren Ges., 15 Wilhelmstrasse, Bochum, Germany. International Convention date, August 14, 1929.

In the manufacture of potassium nitrate by the reaction of potassium sulphate and calcium nitrate, by-products such as $K_2SO_4 \cdot CaSO_4 \cdot H_2O$ and $K_2SO_4 \cdot 5CaSO_4 \cdot H_2O$ are obtained. A cyclic process is described in detail which avoids the production of these by-products.

- 351,310. STYRENES, MANUFACTURE OF. Imperial Chemical Industries, Ltd., Millbank, London. International Convention date, August 20, 1929.

Styrenes are obtained by catalytic dehydrogenation of aromatic compounds having at least one side chain CH_2CH_2R , in which R represents hydrogen or hydrocarbon residue, such as ethyl-benzene, diethyl-benzene, ethyl-diphenyl, chloroethyl-benzenes, isopropyl benzene, cymene, unsymmetrical ditolyl-ethane or ethylnaphthalenes. The temperature may be 450° – 700° C. and the catalyst may be cerium oxide and/or zinc oxide with a promoter consisting of oxide of tungsten, uranium or molybdenum.

- 351,456. WETTING AGENTS. H. T. Böhme Akt.-Ges., 29 Moritzstrasse, Chemnitz, Germany. International Convention date, April 3, 1929.

Aromatic carboxylic acids or aliphatic carboxylic acids containing at least 9 carbon atoms are treated with an alkyl ether of a polyhydric alcohol containing at least one free hydroxy group before, during, or after treating the carboxylic acids with sulphonating agents. Thus ricinoleic acid is sulphonated with oleum, and glycol mono-methyl ether added, or in another case 12-oxystearic acid and glycol mono-ethyl ether are mixed and treated with chloresulphonic acid. The products are wetting, penetrating or dispersing agents.

- 351,322. DYES. Imperial Chemical Industries, Ltd., Millbank, London. International Convention date, August 30, 1929.

An amino-disazo dyestuff $R_1 \rightarrow R_2 \rightarrow R-NH_2$, where R_1 , R_2 and R are residues of the benzene or naphthalene series not containing free hydroxyl or amino groups but containing at least two salt-forming groups, is treated with a nitroaroyl halide, reduced, the resulting aminoaroyl derivative condensed with a nitroaroyl halide, and finally reduced. The resulting disazo dyes give yellow to brown shades on cotton, wool, silk and viscose, and may be diazotized on the fibre and developed to yield dyeings fast to washing. Examples are given.

- 351,359. REDUCTION OF ESTERS. H. T. Böhme, Akt.-Ges., 29 Moritzstrasse, Chemnitz, Germany. International Convention date, November 25, 1929. Addition to 346,237 (see THE CHEMICAL AGE, Vol. xxv, p. 11).

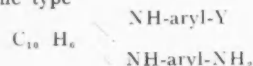
Primary alcohols are produced by the action of sodium and lower alcohols on esters of the corresponding acids under excess pressure of hydrogen. A mixture of triglycerides such as a natural fat may be converted directly into the corresponding alcohols, e.g., coco nut oil may be reduced with *n*-butyl alcohol and sodium under a hydrogen pressure of 5–15 atmospheres. These reactions are promoted by using the alkali metal in finely divided state.

- 351,403. WETTING AGENTS. H. T. Böhme, Akt.-Ges., 29 Moritzstrasse, Chemnitz, Germany. International Convention date, April 5, 1929. Addition to 318,610.

The wetting, dispersing and penetrating properties of preparations for cleansing vegetable or animal fibres are improved by adding sulphonated lauryl alcohol.

- 351,431. DYES. I. G. Farbenindustrie, Akt.-Ges., Frankfurt-on-Main, Germany. International Convention date, December 17, 1928. Addition to 286,274 (see THE CHEMICAL AGE, Vol. xviii, p. 440).

The diazo- or tetrazo-compound of an arylaminonaphthalene of the type



where Y represents hydrogen or an amino group is coupled with a 2:3-oxynaphthoyl-arylamine. The products yield colour lakes and give fast blue to bluish-black shades on the fibre. In an example cotton is impregnated with the 4-chloro-anilide and developed with tetrazotized bis-(4'-amino-phenyl)-2:6- or 2:7-naphthylene-diamine.

- 351,508. SYNTHETIC RESINS.—J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. Application date, February 24, 1930.

Polymerized unsaturated aliphatic acids such as acrylic acids are obtained by first polymerizing the acid halides or nitriles, e.g., by the action of light on the halides, with or without catalysts such as triethylene tetramine or dipiperidyl, or by emulsifying the nitriles and heating to 100° C. with or without catalysts such as hydrogen peroxide or benzoyl peroxide. The products are treated with substances having a reactive hydrogen atom such as water, inorganic bases, mono- and polyhydric alcohols, hydrogen sulphide, mercaptans, ammonia, primary and secondary amines, amides and organic compounds containing a reactive methylene or methine group such as malonic or acetoacetic esters. Details are given of the various alternatives referred to.

- 351,548. CALCIUM BENZOATE AND CALCIUM PHTHALATE. T. Goldschmidt Akt.-Ges., 18 Salkenbergsweg, Essen, Germany. International Convention date, April 3, 1929.

An aqueous suspension of calcium hydroxide and phthalic anhydride in the molecular proportions of 3:1 yields a mixture of calcium phthalate and calcium hydroxide. This is dried at about 110° C. and heated to 350° – 475° C. to obtain calcium benzoate. The reaction mixture may be diluted with material which is already converted and the reaction temperature may be kept constant by a bath of boiling sulphur.

- 351,555. DYES. F. M. Hamer, 55 Dartmouth Park Hill, Kentish Town, London, and Ilford, Ltd., Ilford, Essex. Application date March 28, 1930.

Dyestuffs which are photographic sensitizers are obtained by condensing glutaconic aldehyde at the moment of its liberation from a pyridinium salt, with a quaternary salt of a heterocyclic base, other than pyridine, containing a nitrogen atom and an α -reactive methyl group. Examples are given.

- 351,557. DYES. J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. Application date, March 28, 1930.

Vat dyes identical with the products described in specification 180,367 are obtained by treating the imide chlorides of di-2'-anthraquinonyl-*p*-diaminoaryls with sulphurizing agents. In an example, anthraquinone-2-carboxylic acid chloride is condensed with benzidine and the diamino derivative treated with phosphorus pentachloride. The resulting diimide chloride is heated in naphthalene with sulphur to obtain a product dyeing golden-yellow shades.

351,585. DYES. W. W. Groves, London. From I. G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. Application date, April 2, 1930.

2:3-Hydroxynaphthoyl-1'-amino-3'-chloro-2':4'-dimethoxybenzene (obtained from 2:3-oxynaphthoic acid and the corresponding amine) is combined with diazotized 1-amino-3-methyl-4:6-dichlorobenzene to obtain an azo dyestuff giving turkey-red shades fast to light and boiling lye.

351,605. AMINO-ALKOXY COMPOUNDS. Soc. of Chemical Industry in Basle, Switzerland. International Convention date, April 5, 1929.

Amino-alkoxy aromatic and quinoline compounds containing nuclear halogen which are employed for therapeutic purposes are obtained by treating an aromatic or quinoline compound containing nuclear halogen and a nuclear hydroxyl group with an aminoalkylating agent; or by treating an amino alcohol with a polyhalogen aromatic or quinoline compound so that at least one nuclear halogen remains; or by halogenation of an aminoalkoxy compound of the aromatic or quinoline series; or by replacing a nuclear amino group by halogen via the diazo group; or by treating an aromatic aminoalkoxy compound containing nuclear halogen with glycerine and a condensing agent to obtain the corresponding quinoline compound. Thus, chlorothymol is treated with chloroethyl-diethylamine to obtain 1-diethylamino-ethoxy-2-isopropyl-4-chloro-5-methylbenzene.

351,645. NAPHTHYL FORMAMIDINES. A. M. Clifford, 1649 Honddle Street, Akron, Ohio, U.S.A. Application date, April 29, 1930.

Ageing of rubber and oils is prevented by adding a naphthyl formidine of the formula $R-N=CH-NH-R_1$, where R and R_1 represent naphthyl groups, obtained by treating a naphthylamine with formic acid.

351,774. DYES. I. G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. International Convention date, July 30, 1929.

Phenylene- or naphthylene-di-(1-thioanthraquinone-2-carboxylic acids) are obtained by treating two mols. of 1-chloro- or 1-diazoanthraquinone-2-carboxylic acids with one mol. of a dimercaptan of benzene or naphthalene. These acids are condensed with acid condensing agents such as phosphorus pentachloride with or without aluminium chloride, sulphuric acid, or acetic anhydride with a little concentrated sulphuric acid. The resulting anthraquinone dithioxanthones dye orange to brown shades.

351,515. ALUMINIUM SULPHATE. Chinoïn Gyógyszer és Vegyészeti Termékek Gyara R.T., 5 Tó Utcá Ujpest, near Budapest. International Convention date, March 21, 1929.

Bauxite is treated with concentrated or fuming sulphuric acid in such proportions as to obtain a dry product which can be ground. Calcium carbonate or calcium sulphate may also be added to ensure a dry product. The product may be used as a fertilizer, for improving alkaline soils, or as a weed-killer.

351,518. ACRYLIC ESTERS. J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. Application date, March 24, 1930.

β -chloro-propionic esters are treated by means of acid-reacting difficultly-volatile substances containing an inorganic radicle, such as concentrated sulphuric or phosphoric acid, zinc chloride, or toluene-sulphonic acid, in the presence of a catalyst. The latter is prepared by treating highly active granulated charcoal with aqueous sodium silicate, drying at 100°-150° C., and impregnating with a mixture of phosphoric acid, barium oxide, and phosphorus pentoxide, and heating to 200° C. The process may be effected in the liquid phase, the temperature depending on the boiling point of the ester employed. If the reaction is effected in the vapour phase, the temperature is 150°-250° C.

351,653. ALKALINE ARSENATES. G. N. Kirsebom, 5 Foreningsgatan, Trollhattan, Sweden. International Convention date, May 14, 1929.

Arsenates are produced by the process of reducing metallic compounds with metallic arsenic and an alkali metal compound.

351,749. FERTILIZERS. E. Urbain, 6 Rue Lyautey, Paris. International Convention date, August 29, 1929.

A mixture of silico-aluminous potassium rocks such as felspar or leucite, crude calcium phosphate, lime, and coal, is moistened and agglomerated in steam in an autoclave at 180° C. and heated in a shaft furnace into which air preheated to 400°-600° C. is injected, and a slag capable of yielding cement is obtained. Phosphorus is oxidised by the carbon monoxide and steam, and the vapours of phosphoric anhydride and potash are absorbed in water. The solution of dipotassium phosphate and phosphoric acid is treated with crude calcium phosphate forming mono-calcium phosphate. Gaseous ammonia and ammonium sulphate are added, yielding a fertilizer consisting of dipotassium phosphate, diammonium phosphate and gypsum. In an alternative process, an electric furnace is employed.

351,810. BORIC ACID AND SODIUM SULPHATE. A. Kelly, 57 Chancery Lane, London. Application date, August 30, 1930.

A hot solution of sodium sulphate and bi-sulphate is treated with borax and the highly concentrated liquor decanted from sodium sulphate and treated with sulphuric acid to precipitate boric acid. The liquor is used for creating a further quantity of borax.

351,825. ZINC OXIDE. Metallges. Akt.-Ges., 45 Bockenheimer Anlage, Frankfurt-on-Main, Germany. International Convention date, October 3, 1929.

Substances such as pyrites or zinc blende are roasted in blast roasting apparatus with the waste gases of contact plant for the manufacture of sulphuric acid.

351,841. TITANIUM DIOXIDE. Metal and Thermit Corporation, Carteret, N.J., U.S.A. Assignees of S. J. Lubowsky, 92 Bishop Street, Jersey City, N.J., U.S.A. International Convention date, September 28, 1929.

A mixture of rutile and magnesium oxide or carbonate is heated to 1,410°-1,500° C. to form magnesium titanate, and is treated with concentrated sulphuric acid, diluted with water, and cooled to crystallise magnesium sulphate. The solution is hydrolysed by heating under pressure to 160° C. and the meta-titanic acid which separates is washed and calcined.

351,845. CARNALLITE. Kali-Forschungs-Anstalt Ges., 5 Schönebergerstrasse, Berlin. International Convention date, November 28, 1929.

The mother liquor from the production of potassium or ammonium carnallite is treated with molten or crystallised magnesium chloride hexahydrate and potassium or ammonium chloride, and potassium or ammonium carnallite crystallises out, the mother liquor being used again.

351,877. POTASSIUM ALUMINATE AND PHOSPHATE. I. G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. International Convention date, November 23, 1929.

A mixture of potassium aluminate and phosphate in solution is treated with gaseous ammonia and the mixture separates into two layers. The top layer contains pure aluminate and the bottom phosphate with some aluminate. The top layer is separated and the bottom layer diluted with water, and treated with ammonia again. The ammonia is expelled by heat for use again, and the solutions worked up to tri-potassium phosphate and alumina and potassium carbonate. The original solution is obtained by treating iron aluminium phosphate with caustic potash, or by leaching the product obtained by calcining iron aluminium phosphate with potassium carbonate, or with potassium sulphate and carbon, or with potassium chloride and carbon in the presence of steam.

351,975. GAS PURIFICATION. ALKALI SULPHATES. AND SULPHIDES. J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. Application date, December 24, 1929.

Coal gas or coke-oven gas is passed at 300°-400° C. over nickel oxide to convert the sulphur into sulphur dioxide which is then combined with alkali, preferably ammonia, to form neutral alkali sulphite. The latter in solution is heated under pressure to 200°-300° C. to form alkali sulphate and sulphide. Ammonia and hydrogen sulphide are removed from the liquor by boiling or blowing in steam, and ammonium sulphate may

be crystallised out. The liberated gases may be added to the gas to be purified or may be passed to the ammonia stiller for recovery of ammonia. In examples, the gases are absorbed in water, ammonium sulphite solution or sodium sulphite solution.

351,994. CARBON DISULPHIDE. T. S. Wheeler and W. Francis, Winnington Hall, Northwich, Cheshire, and Imperial Chemical Industries, Millbank, London. Application date, March 29, 1930.

Paraffins such as methane and ethane or olefines such as ethylene are mixed with about 20 per cent. of sulphur or hydrogen sulphide and passed through a reaction chamber at about 1,200° C. and a high space velocity. Gas containing hydrogen sulphide or other sulphur compounds, e.g., natural gas may be treated by this process. The process may be that described for benzene production in Specifications Nos. 332,998 and 342,359 (see THE CHEMICAL AGE, Vol. xxiii, p. 313, and Vol. xxiv, p. 422) or the multi-stage pyrolysis process described in Specification No. 342,319 (see THE CHEMICAL AGE, Vol. xxiv, p. 422). In an example, gas containing methane, ethane, and propane is mixed with 12.5 per cent. hydrogen sulphide and treated at 1,200° C. and a space velocity of 250 reciprocal minutes. One thousand cubic feet of gas yield 0.6 gallons of carbon bisulphide and 0.3 gallons of benzene.

Specifications Accepted with date of Application

- 357,508-9. Phosphatic fertilising materials, Preparation of. W. W. Triggs. (G. Oher and Sons Co.). April 7, 1930.
 357,528. Alkyl chlorides, Production of. W. W. Triggs. (E. I. Du Pont de Nemours and Co.). March 21, 1930.
 357,534. Chemical reactions, Processes for carrying out. Institute für Physikalische Grundlagen der Medizin. June 26, 1929.
 357,536. Vat dyestuffs. Newport Co. July 1, 1929.
 357,539-40. Metals and alloys, Manufacture of. May & Baker, Ltd., and G. S. Higginson. June 19, 1930.
 357,543. Metalliferous dyestuffs, Manufacture of. Soc. of Chemical Industry in Basle. June 20, 1929.
 357,552. Cellulose acetate, Manufacture of. O. Silberrad and H. Bleasdale. March 19, 1930.
 357,560. Condensed products from formaldehyde, Manufacture of. L. Orthner. June 19, 1929.
 357,580. Bleaching phosphate rock, Method of. Kunstdunger-Patent-Verwertungs-Akt.-Ges. July 11, 1929.
 357,581. Monoethanolamine dinitrate or its homologues, Process for the manufacture of. J. Y. Johnson. (Dynamit Akt.-Ges. vorm. J. Nobel & Co.). June 23, 1930.
 357,592. Stable, water-soluble sulphuric acid ester from 4:6-dichloro-6'-methoxy-lis-thionaphthene-indigo. A. Carpmæl. (I.G. Farbenindustrie Akt.-Ges.). June 25, 1930.
 357,593. Vat-dyestuff containing sulphur, Manufacture of. A. Carpmæl. (I.G. Farbenindustrie Akt.-Ges.). June 25, 1930.
 357,630. Purifying solutions by electrolytic means, Process of. I.G. Farbenindustrie Akt.-Ges. June 28, 1929.
 357,695. Alloys. Associated Electrical Industries, Ltd. July 5, 1929.
 357,670. Sulphonated fatty acid derivatives, Manufacture of. Imperial Chemical Industries, Ltd., A. J. Hailwood, and R. P. McGlynn. July 10, 1930.
 357,721. Organic compounds, Process for introducing active oxygen into. G. Schoenberg. August 10, 1929.
 357,743. Polychloronaphthalene, Manufacture of. Imperial Chemical Industries, Ltd., F. Holt, R. Thomas, and C. W. Richards. August 29, 1930.
 357,749. Carbon black, Apparatus for the manufacture of. J. Y. Johnson. (I.G. Farbenindustrie Akt.-Ges.). September 8, 1930.
 357,760. 2-mercapto-benzothiazole and its methyl homologues, Manufacture of. Goodyear Tire & Rubber Co. November 6, 1929.
 357,778. Active carbon and gases containing free hydrogen, Production of. Metallges. Akt.-Ges. October 4, 1929.
 357,795. Alkaline-earth oxides, Manufacture of. I.G. Farbenindustrie Akt.-Ges. October 1, 1929.
 357,798. Dry, high-grade calcium hypochlorite, Production of. I.G. Farbenindustrie Akt.-Ges. October 28, 1929.
 357,800-805. Aluminium alloys. H. W. Clarke and L. Aitchison. October 8 and October 13, 1930.
 357,814. Phosphate rock, Treatment of. Odda Smelteverk Aktielskab and E. Johnson. October 28, 1929.
 357,822. Decomposing and hydrogenating heavy organic compounds to produce light hydrocarbons. J. M. F. D. Florentin and A. J. Kling. November 9, 1929.
 357,860. Organic compounds of antimony, Manufacture of. Wellcome Foundation, Ltd., and W. H. Gray. November 24, 1930.
 357,922. Salts of hydrofluosilicic acid, Production of. M. Buchner. February 24, 1930.
 357,933. Bleaching powder, Production of. I.G. Farbenindustrie Akt.-Ges. March 14, 1930.

Applications for Patents

[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]

- Anderson, I. B., Carter, P. G., Imperial Chemical Industries, Ltd., Thomson, R. F. Production of benzanthrone-derivatives. 28070. October 9.
 Auden, H. A., Distillers Co., Ltd., and Salt, F. E. Manufacture of lactic acid. 28089. October 9.
 Bleachers' Association, Ltd., Farrington, F., Parker, C. S., and Wall, C. L. Manufacture of azo dyestuffs, etc. 27583. October 5.
 Caddick, A. J., Cargo Fleet Iron Co., Ltd. Production of barium carbonate from barium sulphate. 28110. October 9.
 — Production of ammonium sulphate from coke oven gas, etc. 28111. October 9.
 Deutsche Hydrierwerke Akt.-Ges. Softening, emulsifying, etc., agents. 27808. October 7. (Germany, October 7, '30.)
 Dreyfus, H. Manufacture etc. of organic compounds. 27586. October 5.
 — Treatment of aliphatic compounds. 28190. October 10.
 Du Pont de Nemours & Co., E. I. Carrying out operations with ammonia at elevated temperatures. 27850. October 7. United States, October 7, '30.)
 Evans, A. J. Treatment of waste acid from pickling of iron, &c. 27597. October 5.
 Goldstein, R. F., and Imperial Chemical Industries, Ltd. Manufacture of aromatic arylides. 28107. October 10.
 Goodwin, L. F. Manufacture of ammonium bisulphate. 27653. October 5.
 Harris, J. E. G., and Morton Sundour Fabrics, Ltd. Dyeing with vat dyestuffs. 27668. October 5.
 Hydro-Nitro Soc. Anon. Decomposition of hydrocarbons. 27637. October 5. (United States, October 3, '30.)
 I.G. Farbenindustrie Akt.-Ges. Manufacture of azo-dyestuffs insoluble in water. 27763. October 6. (Germany, October 6, '30.)
 — Uniting surfaces by means of adhesives containing rubber. 28123. October 9. (Germany, October 9, '30.)
 — and Kendall, J. D. Manufacture of Dyes. 27792. October 6.
 Johnson, J. Y. (I.G. Farbenindustrie Akt.-Ges.). Process for conversion of solid carbonaceous materials into benzines, etc. 27619. October 5.
 — Johnson, J. Y. Carrying out catalytic reactions. 27794. October 6.
 — Johnson, J. Y. Apparatus for conversion of coals, tars, &c. 27765. October 6. (April 28, '30.)
 — Johnson, J. Y. Manufacture of unsaturated ketones. 27972. October 8.
 Marmier, L. J. A. Catalytic oxidation of ammonia. 27630. October 5. (Belgium, November 4, '30.)
 Naugatuck Chemical Co. Treatment of rubber, &c. 27798. October 6. (United States, October 13, '30.)
 Salerni, P. M. Low-temperature carbonization of carbonaceous materials. 28145. October 9.
 Soc. of Chemical Industry in Basle. Manufacture of cellulose esters. 27762. October 6. (Switzerland, October 17, '30.)

Manufacture of Salicylates in Russia

(RUSSIA is said to be producing salicylic acid, technical and C.P.), sodium salicylate, aspirin and solol. Importation of all of these products was stopped in 1924. Two plants are reported to be producing technical salicylic acid.

Government Ore-Dressing Laboratories, Ottawa

THE September issue of the *Canadian Mining and Metallurgical Bulletin* contains a paper by C. S. Parsons dealing with the laboratories of the Ore Dressing and Metallurgical Division, Mines Branch, Department of Mines, Ottawa. This paper gives an interesting description of the Government Laboratories maintained at Ottawa for the purpose of conducting experimental tests and research on ore treatment. Samples of Canadian ores, ranging from a few hundred pounds to carload lots, are received on application for experimental tests, and all possible methods of treatment are investigated. Reports are issued to the mining company describing the results, with recommendations as to the most economical method of treatment, and these reports have been of valuable assistance to many concerns in Canada preparing plans for the design and equipment of their treatment plants. A copy of the Bulletin in question can be consulted at Canada House, Trafalgar Square, S.W.1.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£17 15s. per ton d/d address U.K. in casks.
 ACID CHROMIC.—11d. per lb., less 2½% d/d U.K.
 ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d, according to purity, strength and locality.
 ACID NITRIC, 80° Tw.—Spot, £20 to £25 per ton makers' works, according to district and quality.
 ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
 AMMONIA (ANHYDROUS).—Spot, 10d. per lb., d/d in cylinders.
 AMMONIUM BICHRIMATE.—8½d. per lb., d/d U.K.
 BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.
 BLEACHING POWDER, 35/37%.—Spot, £7 10s. per ton d/d station in casks, special terms for contracts.
 BORAX, COMMERCIAL.—Crystals, £15 10s. per ton; granulated, £12 10s. per ton; powder, £16 per ton. (Packed in 1 cwt. bags, carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards.)
 CALCIUM CHLORIDE (SOLID), 70/75%.—Spot, £4 15s. to £5 5s. per ton d/d station in drums.
 CHROMIUM OXIDE.—Qd. to 9½d. per lb. according to quantity d/d U.K.
 CHROMETAN.—Crystals, 3½d. per lb. Liquor, £18 12s. 6d. per ton d/d U.K.
 COPPER SULPHATE.—£25 to £25 10s. per ton.
 METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 11d. to 2s. 4d. per gall.; pyridinised industrial, 2s. 1d. to 2s. 6d. per gall.; mineralised, 3s. to 3s. 4d. per gall. 64 O.P., 1d. extra in all cases. Prices according to quantity.
 NICKEL SULPHATE.—£38 per ton d/d.
 NICKEL AMMONIA SULPHATE.—£38 per ton d/d.
 POTASH CAUSTIC.—£30 to £33 per ton.
 POTASSIUM BICHRIMATE CRYSTALS AND GRANULAR.—4½d. per lb. net d/d U.K., discount according to quantity; ground ½d. per lb. extra.
 POTASSIUM CHLORATE.—3½d. per lb. ex-wharf, London, in cwt. kegs.
 POTASSIUM CHROMATE.—8½d. per lb. d/d U.K.
 SALAMMONIAC.—First Imp, spot, £40 17s. 6d. per ton d/d address in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.
 SALT CAKE, UNGROUND.—Spot, £3 10s. per ton d/d station in bulk.
 SODA ASH, 58%.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.
 SODA CAUSTIC, SOLID, 70/77° E.—Spot, £14 10s. per ton, d/d station.
 SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2-cwt. bags.
 SODIUM ACETATE 97/98%.—£21 per ton.
 SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per ton d/d station in bags.
 SODIUM BICHRIMATE CRYSTALS, CAKE, GRANULAR, AND POWDER.—3½d. per lb. net d/d U.K., discount according to quantity. Anhydrous ¾d. per lb. extra.
 SODIUM BISULPHITE POWDER, 60/62%.—£16 10s. per ton delivered 1-cwt. iron drums for home trade.
 SODIUM CHLORATE.—2½d. per lb.
 SODIUM CHROMATE.—3½d. per lb. d/d U.K.
 SODIUM NITRITE.—Spot, £19 per ton, d/d station in drums.
 SODIUM PHOSPHATE.—£14 per ton, f.o.r. London, casks free.
 SODIUM SILICATE, 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.
 SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d.
 SODIUM SULPHIDE SOLID, 60/62%.—Spot, £10 5s. per ton, d/d in drums. Crystals—Spot, £8 5s. per ton, d/d in casks.
 SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton; d/d station in kegs. Commercial—Spot, £9 per ton, d/d station in bags.
 COAL TAR PRODUCTS
 ACID CARBOLIC CRYSTALS.—4½d. to 6½d. per lb. Crude 60's 1s. to 1s. 1d. per gall. August/December.
 ACID CRESYLIC 99/100.—1s. 8d. to 1s. 9d. per gall. B.P., 3s. 6d. per gall. 97/99.—Refined, 1s. 11d. to 2s. 2d. per gall. Pale, 98%, 1s. 7d. to 1s. 8d. Dark, 1s. 4d. to 1s. 4½d.
 ANTHRACENE OIL, STRAINED (GREEN OIL).—4½d. to 4¾d. per gall.
 BENZOLE.—Prices at works: Crude, 7d. to 7½d. per gall.; Standard Motor, 1s. 2d. to 1s. 3d. per gall. 90%.—1s. 3d. to 1s. 4d. per gall. Pure, 1s. 6d. to 1s. 7d. per gall.
 TOLUOLE.—90%, 1s. 9d. to 1s. 10d. per gall. Pure, 1s. 11d. to 2s. per gall.
 XYLOL.—1s. 8d. to 1s. 9d. per gall. Pure, 1s. 11d. to 2s. per gall.
 CREOSOTE.—Standard specification, for export, 4½d. to 5d. net per gall. f.o.b.; for Home, 3½d. per gall. d/d.
 NAPHTHA.—Solvent, 90/100, 1s. 3d. per gall. Solvent, 95/100, 1s. 5d. to 1s. 6d. per gall. Solvent, 90/100, 1s. to 1s. 5d. per gall.

NAPHTHALENE.—Purified Crystals, £10 per ton, in bags.
 PITCH.—Medium soft, 60s.-65s. per ton, in bulk at makers' works.
 PYRIDINE.—90/140, 3s. to 3s. 3d. per gall. 90/160, 3s. 3d. to 3s. 6d. per gall. 90/180, 1s. 9d. to 2s. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:—

ACID GAMMA.—Spot, 3s. 3d. per lb. 100% d/d buyer's works.
 ACID H.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.
 ACID NAPHTHONIC.—1s. 2d. per lb. 100% d/d buyer's works.
 ACID NEVILLE AND WINTHER.—Spot, 2s. 6d. per lb. 100% d/d buyer's works.
 ACID SULPHANILIC.—Spot, 8½d. per lb. 100% d/d buyer's works.
 ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
 ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
 BENZALDEHYDE.—Spot, 1s. 6d. per lb., packages extra, d/d buyer's works.
 BENZIDINE BASE.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.
 o-CRESOL 30/31° C.—£2 6s. 5d. per cwt., in 1-ton lots.
 m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.
 p-CRESOL 34.5° C.—1s. 9d. per lb., in ton lots.
 DICHLORANILINE.—2s. 5d. per lb.
 DIMETHYLANILINE.—Spot, 1s. 6d. per lb., packages extra, d/d buyer's works.
 DINITROBENZENE.—7½d. per lb.
 DINITROTOLUENE.—48 50° C., 7d. per lb.; 66 68° C., 7½d.-8d. per lb.
 DIPHENYLAMINE.—Spot, 1s. 8d. per lb., d/d buyer's works.
 o-NAPHTHOL.—Spot, 1s. 9d. per lb. d/d buyer's works.
 p-NAPHTHOL.—Spot, £65 per ton in 1 ton lots, d/d buyer's works.
 o-NAPHTHYLAMINE.—Spot, 10½d. per lb. d/d buyer's works.
 p-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.
 o-NITRANILINE.—5s. 11d. per lb.
 m-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.
 p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.
 NITROBENZENE.—Spot, 6½d. per lb.; 5-cwt. lots, drums extra, d/d buyer's works.
 NITRONAPHTHALENE.—8½d. per lb.
 SODIUM NAPHTHONATE.—Spot, 1s. 6d. per lb. 100% d/d buyer's works.
 o-TOLUIDINE.—Spot, 9½d. per lb., drums extra, d/d buyer's works.
 p-TOLUIDINE.—Spot, 1s. 6d. per lb. d/d buyer's works.
 m-XYLIDINE ACETATE.—3s. 3d. per lb., 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £6 10s. per ton. Grey, £11 to £13 per ton. Liquor, 7d. to 9d. per gall.
 ACETIC ACID, TECHNICAL, 40%.—£15 15s. per ton.
 ACETONE.—£63 to £65 per ton.
 AMYL ACETATE, TECHNICAL.—85s. to 95s. per cwt.
 CHARCOAL.—£6 10s. per ton, according to grade and locality.
 IRON LIQUOR.—24°/30° Tw., 9d. to 1s. 2d. per gall.
 METHYL ACETONE, 40/50%.—£43 per ton.
 RED LIQUOR.—16° Tw., 7½d. to 9d. per gall.
 WOOD CREOSOTE.—Qd. to 1s. 6d. per gall., unrefined.
 WOOD NAPHTHA, MISCIBLE.—1s. per gall. Solvent, 3s. 6d. to 4s. per gall.
 WOOD TAR.—£1 10s. per ton.
 BROWN SUGAR OF LEAD.—£30 to £32 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 1d. per lb., according to quality; Crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.
 ARSENIC SULPHIDE, YELLOW.—1s. 5d. to 1s. 7d. per lb.
 BARYTES.—£7 to £8 10s. per ton, according to quality.
 CADMIUM SULPHIDE.—3s. 3d. to 3s. 6d. per lb.
 CARBON BISULPHIDE.—£26 to £28 per ton, according to quantity; drums extra.
 CARBON, BLACK.—3½d. to 4½d. per lb., ex wharf.
 CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity drums extra.
 CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.
 DIETHYLENEDIAMINE.—2s. 6d. per lb.
 INDARUBBER SUBSTITUTES, WHITE.—4d. to 5½d. per lb.; Dark, 4d. to 4½d. per lb.
 LAMP BLACK.—£30 per ton.
 LITHOPONE, 30%.—£20 to £22 per ton.
 SULPHUR.—£11 10s. to £15 15s. per ton.
 MINERAL RUBBER "RUPRON."—£17.
 PIPERIDINE RUBBER ACCELERATORS.—P.P.D., 10s. 6d. to 11s. 6d. per lb.; Z.P.D., 7s. to 7s. 6d. per lb.; L.P.D., 6s. 6d. to 7s. per lb.
 SULPHUR CHLORINE.—4d. to 7d. per lb., according to quality.
 SULPHUR PRECIP. B.P.—£55 to £60 per ton, according to quantity.
 SULPHUR PRECIP. COMMERCIAL.—£40 to £45 per ton.
 VERMILION, PALE OR DEEP.—6s. 8d. to 6s. 10d. per lb.
 ZINC SULPHUR.—10d. to 1s. 1d. per lb.

Pharmaceutical and Photographic Chemicals

ACETANILIDE.—1s. 4d. to 1s. 6d. per lb.
 ACID, ACETIC, PURE, 80%.—£35 5s. per ton d/d address U.K. in casks.
 ACID, ACETYL SALICYLIC.—2s. 7d. to 2s. 9d. per lb., according to quantity.
 ACID, BENZOIC B.P.—1s. 10d. per lb., for synthetic product. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.
 ACID, BORIC B.P.—Crystal, £34 per ton; powder, £35 per ton; For one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
 ACID, CAMPHORIC.—19s. to 21s. per lb.
 ACID, CITRIC.—1s. 0½d. per lb., less 5%.
 ACID, GALLIC.—2s. 9d. per lb., for pure crystal, in cwt. lots.
 ACID, MOLYBDIC.—6d. 3d. per lb. in ½-cwt. lots. Packages extra. Special prices for quantities and contracts.
 ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. for 28-lb. lots; Resublimed, 8s. 6d. per lb. for 28-lb. lots, d/d.
 ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 8d. per lb. Technical.—1s. to 1s. 2d. per lb.
 ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
 ACID, TARTARIC.—1s. 0½d. per lb., less 5%.
 AMIDOL.—7s. 6d. to 11s. 3d. per lb., according to quantity.
 AMMONIUM BENZOATE.—3s. 6d. per lb.
 AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5-cwt. casks. Resublimed, 1s. per lb.
 AMMONIUM MOLYBDATE.—6s. 3d. per lb. in ½ cwt. lots. Packages extra. Special prices for quantities and contracts.
 ATROPHINE SULPHATE.—7s. to 7s. 6d. per oz., according to quantity.
 BARBITONE.—5s. 9d. to 6s. per lb.
 BENZONAPHTHOL.—2s. 10d. per lb.
 BISMUTH CARBONATE.—7s. 9d. per lb.
 BISMUTH CITRATE.—9s. 2d. per lb.
 BISMUTH SALICYLATE.—7s. 9d. per lb.
 BISMUTH SUBNITRATE.—6s. 6d. per lb.
 BISMUTH NITRATE.—Cryst. 5s. 1d. per lb.
 BISMUTH OXIDE.—11s. 1d. per lb.
 BISMUTH SUBCHLORIDE.—10s. 9d. per lb.
 BISMUTH SUBGALLATE.—7s. 4d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth sales respectively.
 BISMUTH ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 2d. per lb.; 6 W. Qts. 11½d. per lb.; 12 W. Qts. 10d. per lb.; 36 W. Qts. 9½d. per lb. Liquor Bismuth B.P., in W. Qts., 1s. 2d. per lb.; 6 W. Qts., 11½d. per lb.; 12 W. Qts. 10d. per lb.; 36 W. Qts., 9½d. per lb.
 BORAX B.P.—Crystal, £23 10s. per ton; powder, £24 per ton; for one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
 BROMIDES, B.P.—Ammonium, 1s. 7d. per lb.; potassium, 1s. 4d. per lb.; granular, 1s. 5d. per lb.; sodium, 1s. 6d. per lb. Prices for 1-cwt. lots.
 CAFFEIN, PURE.—6s. 6d. per lb.
 CAFFEIN CITRAS.—5s. per lb.
 CALCIUM LACTATE.—B.P., 1s. 1½d. to 1s. 3d. per lb., according to quantity.
 CAMPHOR.—Refined flowers, 2s. 11d. to 3s. 1d. per lb., according to quantity; also special contract prices.
 CHLORAL HYDRATE.—2s. 11½d. to 3s. 1½d. per lb.
 CHLOROFORM.—2s. 4d. per lb.
 ETHERS.—S.G. .730—1s. 1d. to 1s. 2d. per lb., according to quantity; other gravities at proportionate prices.
 FORMALDEHYDE, 40%.—30s. per cwt. in barrels, ex wharf.
 GLUCOSE, MEDICINAL.—1s. 6d. to 2s. per lb. for large quantities.
 HEXAMINE.—1s. 10d. to 2s. per lb., according to quantity.
 HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 3s. per gall.
 HYDROQUINONE.—4s. 7d. per lb. in 1-lb. lots; 3s. 5½d. per lb. in cwt. lots.
 HYPOPHOSPHITES.—Calcium, 2s. 11d. to 3s. 4d. per lb.; potassium, 3s. 2d. to 3s. 7d. per lb.; sodium, 3s. 1d. to 3s. 6d. per lb.; for 28-lb. lots.
 IRON AMMONIUM CITRATE.—B.P., 1s. 9d. per lb. for 28-lb. lots. Green, 2s. 6d. per lb., list price. U.S.P., 2s. 7d. per lb. list price.
 IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.
 IRON QUININE CITRATE.—B.P., 8½d. to 8½d. per oz.
 MAGNESIUM CARBONATE.—Light B.P., 36s. per cwt.
 MAGNESIUM OXIDE.—Light Commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
 MENTHOL.—A.B.R. recrystallised B.P., 13s. 6d. per lb. net; Synthetic, 8s. 6d. to 12s. per lb.; Synthetic detached crystals, 8s. 6d. to 9s. 9d. per lb., according to quantity; Liquid (95%), 8s. per lb.
 MERCURIALS B.P.—Up to 1-cwt. lots, Red Oxide, crystals, 9s. 4d. to 9s. 5d. per lb., levig., 8s. 10d. to 8s. 11d. per lb.; Corrosive Sublimate, Lump, 7s. 5d. to 7s. 6d. per lb., Powder, 6s. 8d. to 6s. 9d. per lb.; White Precipitate, Lump, 7s. 5d. to 7s. 6d. per lb.; Powder, 7s. 6d. to 7s. 7d. per lb.; Calomel, 8s. to 8s. 1d.

per lb.; Yellow Oxide, 8s. 7d. to 8s. 8d. per lb.; Persulph, B.P.C., 7s. 9d. to 7s. 10d. per lb.; Sulph. nig., 8s. 2d. to 8s. 3d. per lb. Special prices for larger quantities.
 METHYL SALICYLATE.—1s. 3d. to 1s. 4d. per lb.
 PARA-FORMALDEHYDE.—1s. 6d. per lb.
 PARALDEHYDE.—1s. 1d. per lb.
 PHENACETIN.—3s. 9d. to 4s. 1d. per lb.
 PHENOLPHTHALEIN.—5s. to 5s. 2½d. per lb.
 POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—90s. per cwt., less 2½ per cent.
 POTASSIUM CITRATE.—B.P., 1s. 7d. per lb. for 28-lb. lots.
 POTASSIUM FERRICYANIDE.—1s. 7½d. per lb., in 125-lb. kegs.
 POTASSIUM IODIDE.—B.P., 20s. 9d. to 23s. 9d. per lb., as to quantity.
 POTASSIUM METABISULPHITE.—50s. per cwt. d/d London, kegs free.
 POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.
 QUININE SULPHATE.—1s. 8d. per oz. for 1,000-oz. lots.
 SACCHARIN.—43s. 6d. per lb.
 SALICIN.—16s. 6d. to 17s. 6d. per lb., according to quantity.
 SILVER NITRATE.—10d. per oz. for 500-oz. lots, sticks, 2d. per oz. extra.
 SODIUM BARBITONUM.—8s. 6d. to 9s. per lb. for 1-cwt. lots.
 SODIUM BENZOATE B.P.—1s. 6d. to 1s. 7½d. per lb.
 SODIUM CITRATE.—B.P.C. 1911, 1s. 4d. per lb. B.P.C. 1923, and U.S.P., 1s. 8d. per lb., for 28-lb. lots.
 SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
 SODIUM NITROPRUSSIDE.—16s. per lb.
 SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—73s. per cwt. net. Crystals, 2s. 6d. per cwt. extra.
 SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. 2d. per lb. Crystal, 1s. 11d. to 2s. 3d. per lb.
 SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.
 SODIUM SULPHITE, ANHYDROUS.—£26 to £28 per ton, according to quantity. Delivered U.K.
 STRYCHNINE, ALKALOID CRYSTAL, 2s. per oz.; hydrochloride, 1s. 9½d. per oz.; nitrate, 1s. 8d. per oz.; sulphate, 1s. 9d. per oz., for 1,000-oz. quantities.
 TARTAR EMETIC, B.P.—Crystal or powder, 1s. 9d. to 2s. per lb.
 THYMOL.—Puriss., 6s. 1½d. to 7s. per lb., according to quantity. Natural, 12s. per lb.
 ZINC STEARATE.—1s. 4d. to 1s. 6d. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.
 AUBEPINE (EX ANETHOL).—8s. 9d. per lb.
 AMYL ACETATE.—2s. 3d. per lb.
 AMYL BUTYRATE.—4s. 9d. per lb.
 AMYL CINNAMIC ALDEHYDE.—8s. 6d. per lb.
 AMYL SALICYLATE.—2s. 6d. per lb.
 ANETHOL (M.P. 21/22° C.).—5s. per lb.
 BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
 BENZYL ACETATE FROM CHLORINE-FREE ALCOHOL.—1s. 9d. per lb.
 BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 9d. per lb.
 BENZYL BENZOATE.—2s. 2d. per lb.
 CINNAMIC ALDEHYDE NATURAL.—10s. 6d. per lb.
 COUMARIN.—12s. per lb.
 CITRONELLOL.—7s. 3d. per lb.
 CITRAL.—6s. per lb.
 ETHYL CINNAMATE.—6s. 9d. per lb.
 ETHYL PHTHALATE.—2s. 6d. per lb.
 EUGENOL.—7s. 6d. per lb.
 GERANIOL.—6s. to 10s. per lb.
 GERANIOL (FROM PALMAROSA).—14s. per lb.
 HELIOTROPINE.—5s. 6d. per lb.
 ISO EUGENOL.—9s. per lb.
 LINALOL (EX BOIS DE ROSE).—5s. 6d. per lb.
 LINALYL ACETATE, EX BOIS DE ROSE.—7s. 6d. per lb. Ex Shui Oil, 7s. 6d. per lb.
 METHYL ANTHRANILATE.—6s. per lb.
 METHYL BENZOATE.—4s. 3d. per lb.
 MUSEXYL.—6s. 6d. per lb.
 PHENYL ETHYL ACETATE.—10s. per lb.
 PHENYL ETHYL ALCOHOL.—8s. 3d. per lb.
 RHODINOL.—40s. per lb.
 SAFROL.—1s. 6d. per lb.
 VANILLIN, EX CLOVE OIL.—14s. 6d. to 16s. 6d. per lb. Ex Guaiacol.—13s. to 15s. per lb.

Essential Oils

ANISE OIL.—2s. 4d. per lb.
 BERGAMOT OIL.—7s. 9d. per lb.
 BOURBON GERANIUM OIL.—17s. per lb.
 CAMPHOR OIL.—White, 75s. per cwt.; Brown, 75s. per cwt.
 CANANGA.—Java, 7s. per lb.
 CINNAMON OIL LEAF.—4s. per oz.
 CITRONELLA OIL.—Java, 2s. 6d. per lb., c.i.f. Pure Ceylon, 2s. per lb.
 CLOVE OIL, 90/92%.—6s. per lb.
 EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—1s. 4d. per lb.
 LAVENDER OIL.—Mont Blanc, 38/40%, 9s. per lb.
 LEMON OIL.—4s. 3d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, October 15, 1931.

MARKETS have tended to become a little steadier during the past week, although conditions are still very abnormal and in numerous cases prices quoted are purely nominal. A large amount of business is being placed for early delivery. It is, however, impossible to quote definite prices for forward delivery as the forward position is too uncertain.

General Chemicals

ACETONE.—Is in active request with the market very firm at £62 per ton.
ACID, ACETIC.—Prices have advanced £2 per ton, and are now £36 5s. to £38 5s. for Technical 80% and Pure 80% £37 5s. to £39 5s. There is a brisk demand.
ACID, CITRIC.—Continues firm at 1s. 2d. per lb. less 5% with rather more business being placed.
ACID, FORMIC.—Has been in active request with supplies very short for early delivery. The market is nominal at £44 per ton.
ACID, OXALIC.—Continues in strong demand with the market extremely firm at £42 to £43 per ton in casks.
ALUMINO SULPHATE.—An active demand is being received with prices firm at £8 10s. to £9 10s. per ton.
ARSENIC.—The market continues nominal with supplies difficult for early delivery.
CREAM OF TARTAR.—Firm and in good demand at 94s. to 96s. per cwt. less 2½%.
FORMALDEHYDE.—In active demand with the market firm at £27 to £28 per ton.
LEAD ACETATE.—In active request with price quoted at about £37 to £39 per ton for White, with Brown £1 per ton less.
LITHOPONE.—Firm at about £22 per ton.
POTASSIUM BICHROMATE.—Continues extremely firm at 4½d. per lb. with an active demand.
POTASSIUM CHLORATE.—The market is firm and in active request at about £32 to £34 per ton.
PERMANGANATE OF POTASH.—In steady request at about 6½d. per lb.
POTASSIUM PRUSSATE.—Supplies are difficult for early delivery with the market exceptionally firm at about 8½d. per lb.
SODIUM BICHROMATE.—In active demand with the market firm at 3½d. per lb.
SODIUM CHLORATE.—In extremely short supply with the market active at about £28 to £30 per ton.

Latest Oil Prices

LONDON, October 14.—LINSEED OIL closed quieter. Spot, ex mill, £18 10s.; October, £15 2s. 6d.; October-December, £15 15s.; January-April, £17 5s.; May-August, £18, naked. RAPE OIL was steady. Crude, extracted, £29 10s.; technical, refined, £31 10s., naked, ex wharf. COTTON OIL was firm. Egyptian, crude, £22 10s.; refined common edible, £26 10s.; and deodorised, £28 10s., naked, ex mill. TURPENTINE was steady. American, spot, 52s. 6d. per cwt.
HULL.—LINSEED OIL, spot and October, closed at £16 5s. per ton; November-December, £16 10s.; January-April, £17 5s.; and May-August, £18 per ton, naked. COTTON OIL.—Bombay, crude, spot, not quoted. Egyptian, crude, spot, £22 15s.; edible, refined, spot, £25 10s.; technical, spot, £25 10s.; deodorised, £27 10s., naked. PALM KERNEL OIL.—Crude, f.m.q., spot, £22 10s., naked. GROUNDNUT OIL.—Crushed-extracted, spot, £29; deodorised, £33. SOYA OIL.—Crushed-extracted, spot, £18 10s.; deodorised, £22. RAPE OIL.—Crushed-extracted, spot, £28 10s.; refined, £30 10s. per ton. COD OIL, 17s. per cwt. TURPENTINE not quoted. CASTOR OIL.—Pharmacy, spot, 45s. 6d.; firsts, 40s. 6d.; seconds, 38s. 6d. per cwt.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—Export.—During the week the market has remained steady at £5 15s. per ton f.o.b. in single bags. Home.—It is reported that considerable business for spring delivery is being transacted at £6 5s. per ton. It is expected that the consumption of sulphate of ammonia will show a large increase on account of the lower prices in operation this season.

NITRATE OF SODA.—Since the prices in the U.K. have been withdrawn we have not heard of any fresh announcement. As practically the whole of this product is sold for consumption in the spring it may be some little time yet before prices are announced.

South Wales By-Products

THERE is scarcely any change in South Wales by-product activities. The expected better call for pitch has not yet materialised, but, with patent fuel in better demand, an early improvement in the pitch call is fairly certain. Road tar continues to have a fair call round about 13s. to 14s. per 40-gallon barrel delivered. Refined tars have a steady, if moderate, call with values for both gasworks and coke-oven tar unchanged. There is no change in naphthas. Solvent has

SODIUM PRUSSATE.—In good request with the market firm at 4½d. to 5½d. per lb.

TARTAR EMETIC.—A small business is passing at 11½d. per lb.

The following additional market conditions are reported:—

CARBOIC ACID.—Prices, generally speaking, are unchanged though in sympathy with other chemicals there is a firmness noticeable in the market, and we have heard of rather higher prices being obtained for export business, though of this we have had no actual confirmation.

ASPIRIN.—A fair volume of business is being done at the price of 2s. 7d. to 2s. 9d. per lb.

METHYL SALICYLATE.—New prices are now established at 1s. 4½d. to 1s. 5½d.

SALICYLATES.—All Salicylates are firmer in tone, though other prices are unchanged for the present.

SODIUM ACETATE.—Fairly brisk business is being done at distinctly higher prices; the general market price to-day being at about £20 per ton.

SACCHARIN-MONSANTO.—Unaltered at 43s. 6d. per lb., duty paid.

VANILLIN.—Quoted to-day at rather higher rates: Clove Oil material of British manufacture being offered at 16s. to 18s. per lb. and Guaiacol at 14s. 3d. to 16s. 3d. per lb. according to quantity.

Coal Tar Products

PRICES of Coal Tar Products are unchanged from last week, and owing to the uncertainty which still exists, there is a lack of business.

MOTOR BENZOL.—Quoted at about 1s. 4½d. to 1s. 5½d. per gallon f.o.r.

SOLVENT NAPHTHA.—Remains at about 1s. 1½d. to 1s. 2d. per gallon f.o.r.

HEAVY NAPHTHA.—Obtainable at about 11d. to 1s. 0½d. per gallon f.o.r.

CREOSOTE OIL.—Unchanged at about 3d. to 3½d. per gallon f.o.r. in the North and at about 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—Remains at about 1s. 6d. per gallon f.o.r. for the 98/100% quality, and at about 1s. 4d. per gallon for the Dark quality 95/97%.

NAPHTHALENES.—Quoted at about £2 5s. to £2 10s. per ton for the firefighter quality, at about £2 15s. to £3 per ton for the 74/76 quality, and at about £4 per ton for the 76/78 quality.

PITCH.—Unchanged, at 55s. to 57s. 6d. per ton f.o.b. East Coast port.

a small call, but heavy has very little demand. Motor benzol remains fair, but creosote is weak. Patent fuel and coke shipments are better. Patent fuel quotations, for export, are as follows:—19s. to 19s. 6d., ex-ship Cardiff; 18s. to 18s. 6d., ex-ship Swansea. Coke prices are: Best foundry, 32s. 6d. to 36s. 6d.; good foundry, 22s. 6d. to 25s.; furnace, 15s. 6d. to 16s.

Scottish Coal Tar Products

THERE is not a great deal of new business offering, but distillers are firm in their ideas. Pitch is not too plentiful and controlled price of blast furnace quality has been raised 2s. 6d. per ton.

Creosylic Acid.—While quotations are steady there is not much new business on hand. Pale, 99/100 per cent., 1s. 5d. to 1s. 6d. per gallon; pale, 97/99 per cent., 1s. 3d. to 1s. 4d. per gallon; dark, 97/99 per cent., 1s. 2d. to 1s. 3d. per gallon; all f.o.r. High boiling is scarce with value not under 2s. 9d. to 3s. 3d. per gallon ex works.

Carbolic Sixties.—Production is low and value remains steady at 1s. 5d. to 1s. 6d. per gallon according to quality.

Creosote Oil.—Some forward contracts have been placed at current values. Specification oils, 2½d. to 3d. per gallon; washed oil, 3½d. to 3½d. per gallon; gas works ordinary, 3½d. to 3½d. per gallon; all f.o.r. works in bulk.

Coal Tar Pitch.—With distillers still turning out large quantities of road tar there is not much pitch on offer. F.o.b. value is 47s. 6d. to 50s. per ton at home, about 45s. per ton ex works.

Blast Furnace Pitch.—As production is low and Pitch market generally firmer, controlled prices have been increased to 32s. 6d. per ton f.o.r. works; and 37s. 6d. per ton f.a.s. Glasgow for export.

Refined Coal Tar.—The output is remarkably large for the time of the year. Price to-day is firm at 2½d. to 2½d. per gallon ex works.

Blast Furnace Tar.—Remains at 2½d. per gallon ex works.

Water White Products.—Market is dull and uninteresting. Motor Benzole, 1s. 3½d. to 1s. 4½d. per gallon; 90/160 solvent, 1s. 2½d. to 1s. 3½d. per gallon; and 90/190 heavy solvent, 1s. 0½d. to 1s. 1½d. per gallon; all f.o.r. in bulk.

Price of Chilean Nitrate

COSACH (Compania Salitrera Chilena) announces a new price—\$36 a ton of 2,000 lb. for Chilean nitrate, as against \$41 last year. The new price runs till June 30, 1932.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. Chas. Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.

Glasgow, October 13, 1931.

THE present position in the Scottish heavy chemical market is very unsettled. The Gold Standard departure has had the effect of generally raising prices.

Industrial Chemicals

ACETONE.—B.G.S.—£60 to £63 per ton, ex wharf, according to quantity.

ACID, ACETIC.—Prices ruling are as follows: glacial, 98.100%, £47 to £58 per ton; pure, £37 5s. per ton; technical, 80%, £36 5s., delivered in minimum lots of 1 ton.

ACID, BORIC.—Granulated commercial, £25 per ton; crystals, £26 per ton; B.P. crystals, £34 per ton; B.P. powder, £35 per ton, in 1-cwt. bags, delivered Great Britain free in one-ton lots upwards.

ACID, HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. per carboy, ex works, full wagon loads.

ACID, NITRIC, 80° QUALITY.—£23 per ton, ex station, full truck loads.

ACID, OXALIC.—98.100%.—On offer at £42 to £43 per ton, ex store.

ACID, SULPHURIC.—£3 7s. 6d. per ton, ex works, for 144° quality. £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID, TARTARIC, B.P. CRYSTALS.—Quoted 11d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted round about £8 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 10s. per ton, c.i.f. U.K. ports. Crystal meal, about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 10½d. per lb., containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 80°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station.

ANTIMONY OXIDE.—Spot material obtainable at round about £34 per ton, ex wharf.

ARSENIC, WHITE POWDERED.—Quoted £23 10s. per ton, ex wharf. Spot material still on offer at £24 per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £10 10s. to £11 10s. per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 15s. per ton, delivered in minimum 4-ton lots.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 15s. to £5 5s. per ton, according to quantity and point of delivery.

COPPERAS, GREEN.—At about £3 15s. per ton, f.o.r. works, or £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Now quoted £29 per ton, ex store.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station.

LEAD, RED.—Price now £30 per ton, delivered buyer's works.

LEAD, WHITE.—Quoted £38 per ton, carriage paid.

LEAD ACETATE.—White crystals quoted round about £42 to £44 per ton c.i.f. U.K. ports. Brown on offer at about £1 per ton less.

MAGNESITE, GROUND CALCINED.—Quoted £9 10s. per ton, ex store.

METHYLATED SPIRIT.—Industrial quality 64 o.p., quoted 2s. per gallon, less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4½d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—Spot material on offer, £23 10s. per ton ex store.

POTASSIUM CHLORATE, 99½/100% POWDER.—Quoted £26 15s. per ton ex store; crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £20 17s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5½d. per lb. ex wharf.

POTASSIUM PRUSSIAN (YELLOW).—Spot material quoted 7d. per lb., ex store.

SODA, CAUSTIC.—Powdered 98/99%, £17 10s. per ton in drums, £18 15s. in casks. Solid 76/77%, £14 10s. per ton in drums, £14 12s. 6d. per ton for 70/72% in drums; all carriage paid buyer's station, minimum four-ton lots; for contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3½d. per lb., delivered buyer's premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 7s. 6d. per ton extra. Light soda ash; £7 13s. per ton, ex quay, minimum four-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 2s. 6d. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £15 per ton, ex station, minimum four-ton lots.

SODIUM NITRATE.—Price not yet fixed.

SODIUM PRUSSIAN.—Quoted 5½d. per lb., ex store. On offer at 5d. per lb., ex wharf to come forward.

SODIUM SULPHATE (SALTCAKE).—Price, 60s. per ton, ex works; 65s. per ton, delivered, for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid 61/62%, £10 per ton; broken, 60/62%, £11 per ton; crystals 30/32%, £8 2s. 6d. per ton, delivered buyer's works on contract, minimum four-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £9 5s. per ton; ground American, £8 10s. per ton, ex store.

ZINC CHLORIDE 98%.—British material now offered at round about £18 10s. per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £11 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Forest Products Research

THE largest and most complete establishment in the world for research on wood is to be constructed in the United States at Madison, Wisconsin, at the new building for the Forest Products Laboratory, of which Dr. C. P. Winslow is director. The building is to be completed in one year and is the principal award under a \$900,000 congressional appropriation. Dry kilns equipped for close control of temperature, humidity, and air circulation will help to solve seasoning problems. A cold-storage chamber will be provided in which green logs and timber can be kept in unchanged condition for experimental work at any time. In the humidity rooms wood will be brought to the exact moisture content desired for study under conditions simulating any season or any climate of the temperate zone. There will be an ultra-violet ray chamber, where wood can be sterilised for mycological studies and where paints and other materials can be exposed for test.

Provision is also made for a large timber preservation laboratory; a wood fermentation unit; fractionating stills; a general section for wood chemistry, wood gluing, painting, finishing, and fireproofing; and facilities for the study of wood fungi and insect pests.

Mineral Pigment Production in Canada

THE Dominion Bureau of Statistics at Ottawa reports that 6,506 tons of iron oxides were consigned from Canadian deposits in 1930, production during the year having reached 6,518 tons, worth \$115,932. Deliveries during the year were made from deposits in Quebec and British Columbia, the former accounting for over 99 per cent. of the total. The yellow ochres and raw siennas used as pigments are largely obtained from natural deposits of hydrated ferric oxide (limonite); Spanish red oxide is the mineral hematite. It is interesting to note that rapid progress has been made by colour manufacturers in the perfection of high-class chemically-produced oxide pigments, and many users who formerly purchased the natural mined pigments now prefer the artificial product.

Argentine Casein Exports Decrease

PRELIMINARY figures for Argentine exports of casein during the first six months of 1931 show a sharp decline, much greater proportionately in value than in weight, shipments amounting to 7,052 metric tons, valued at 494,085 gold pesos, compared to 9,384 tons, worth 2,064,484 gold pesos in the first six months of 1930. During the period concerned the value of the gold peso varied from 80.87 to 80.73.

BROOMWADE

ROTARY COMPRESSORS & EXHAUSTERS

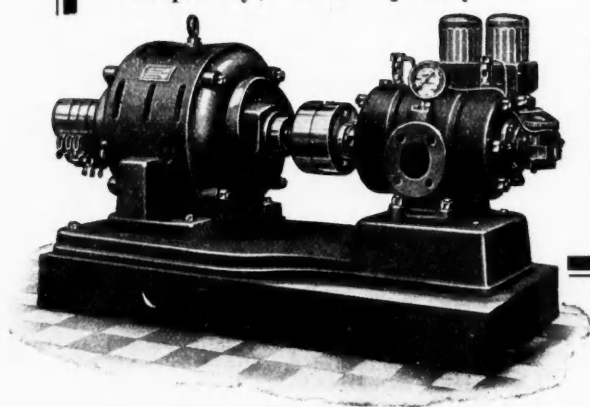
MANUFACTURED in a range of sizes from 6 to 1200 cubic feet per minute capacity, the "Broomwade" Rotary Machine is super-efficient, and its running speed and low starting torque enable it to be direct coupled to comparatively high speed squirrel-cage motors or other forms of driving units.

As a compressor for pressures from 4 to 40 lbs per square inch, or as an Exhauster with a vacuum reading within .23 of the barometer, this machine is pre-eminent in its class, whilst the rugged construction, simplicity, and quality of

materials and workmanship are cardinal features which are strikingly apparent to the Plant Engineer.

Among this range there is a machine particularly suitable for your special needs—a machine capable of giving under the most arduous conditions a full measure of efficiency and reliability, and a machine embodying the results of 30 years' exhaustive effort in the design, manufacture and installation of Air Compressing Machinery.

The name "Broomwade" has become the standard by which Air Compressing Machinery is set; that is why Engineers the world over specify "Broomwade" when conditions call only for the Best Possible.



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BROOM & WADE LTD
HIGH WYCOMBE

Manchester Chemical Market

[FROM OUR OWN CORRESPONDENT.]

Manchester, October 15, 1931.

WITH sterling more or less stable at the moment chemical traders are finding transactions in imported products somewhat less harassing to carry through. Business generally is on much steadier lines than it has been during the past week or two, the panic buying then experienced being now almost entirely absent from the market. The cotton trade locally is more active, and although the improvement has not yet reached the dyeing and finishing stages, so far as the recent new business is concerned, these important chemical-using branches should be feeling the benefit before long. Meanwhile, quotations are steady to firm in almost every section.

Heavy Chemicals

Bicarbonate of soda continues to be quoted at the old figure of £10 10s. per ton, with the demand on quietly steady lines. Caustic soda, also, is unchanged on the contract basis of £12 15s. to £14 per ton, according to quality, and a fair movement of this material is reported. The demand for chlorate of soda is on a quiet scale, with current offers running at the higher levels of £30 to £31 per ton. Bichromate of soda is nominally unchanged at about 3½d. per lb., a moderate business being done. Not a great deal of inquiry has been reported this week in respect of saltcake, quotations for which are at up to £3 per ton. Phosphate of soda is in quiet demand, with values firm at about £12 10s. per ton for the di-basic quality. Sulphide of sodium has also moved up, the 60-65 per cent. concentrated solid material being offered at from £10 to £10 10s. per ton, and the commercial variety at about £8. Prussiate of soda is in quiet demand, with offers ranging from 4½d. to 5½d. per lb., according to quantity. Alkali is steady at round £6 per ton and a fair inquiry is being experienced. The demand for hyposulphite of soda is on comparatively quiet lines, and values are unchanged on balance at from £15 to £15 10s. per ton for the photographic quality and about £9 5s. for the commercial.

Almost all sections of the market for potash compounds are maintained at the higher levels. A quiet business is being put through in the case of carbonate of potash, with current offers at round £28 10s. per ton. Caustic potash is attracting a moderate amount of attention, and round £40 per ton is now being indicated. The demand for permanganate of potash at the moment is not of much consequence but quotations are firm at about 6½d. per lb. for the B.P. grade and 6¼d. for the commercial. A quiet trade is passing in bichromate of potash, with quotations at round 5½d. per lb. Yellow prussiate of potash is on offer at 8½d. per lb., with chlorate well held in the neighbourhood of £33 per ton.

Prompt offers of Cornish white arsenic are exceedingly scarce, and values are more or less nominal at round £26 per ton, at the mines, imported material being quoted at about £23 per ton, ex store. Sulphate of copper is in moderate request and prices are somewhat steadier at round £19 per ton, f.o.b. The demand for the acetates of lime is on a comparatively quiet scale, but at round £12 per ton for the grey material and £7 5s. for the brown prices are much the same as at last report. The lead products generally are in quiet demand, with values fairly steady at £32 10s. and £33 10s. per ton, respectively, for the brown and white acetates, and about £29 for nitrate.

Acids and Tar Products

Acetic acid is in moderate demand and firmer at £38 5s. per ton for the 80 per cent. commercial quality, and about £51 for the technical glacial. Oxalic acid is in quiet call at about 42s. per cwt., ex store. Tartaric acid is quoted at the recent advance to 1s. 0½d. per lb., with citric on offer at round 1s. 1½d. per lb. Pitch keeps very firm at 55s. to 57s. 6d. per ton, f.o.b., and a fair volume of business continues to be reported in this material. The demand for creosote oil, however, continues on very moderate lines, with offers held at from 3½d. to 4½d. per gallon, naked, at works. Carbolic acid is fairly firm at the moment at up to 6d. per lb., f.o.b., for crystals, and round 1s. 5d. per gallon, naked, at works, for crude 60's. Solvent naphtha is not too freely offered at the moment and prices are well held at 1s. 3½d. per gallon, naked.

Company News

ALEXANDER DUCKHAM & CO.—An interim dividend of 3 per cent., less tax, has been declared.

BROKEN HILL SOUTH.—The net profit for the year ended June 30 last was £50,276.

MINERALS SEPARATION, LTD.—An interim dividend of 5 per cent., less tax, has been declared payable on October 22.

INTERNATIONAL ALUMINIUM CO.—The board has decided to pay in April next 3½ per cent., being the final dividend of 1¼ per cent. for the year ending December 31 next, and an interim dividend of 1¼ per cent. for the first three months of 1932.

UNILEVER AND UNILEVER N.V.—Interim dividends have been declared on the ordinary shares at the rate of 48 Dutch cents per share, which amount converted into Sterling at the rate of exchange ruling on October 13 is equal to 1s. per share (5 per cent. on present nominal value of £1 shares).

ASSOCIATED DYERS AND CLEANERS.—With a view to conserving resources and owing to the difficult industrial conditions of the present time, the directors have decided to pay no interim dividend on the £500,000 ordinary share capital. Last year there was an interim on the ordinary of 2½ per cent., followed by a final of 3½ per cent., making a total of 6 per cent.

BORAX CONSOLIDATED, LTD.—The directors announce that they regret they are again unable to declare an interim dividend on the preferred ordinary shares. The general trade depression in all countries, they state in a circular to shareholders, has continued to affect the demand for borax from the industries supplied by the company. Owing to this condition it has been impossible for the company to earn a dividend on its preferred ordinary shares during the past financial year. As trade revives the borax industry will benefit, not only by the increased demand from regular industrial users, but from industries which have only recently taken up the use of borax, and therefore with a return to normal conditions the company may anticipate a substantial increase in its earning power.

Extraction of Caffeine from Brazilian Coffee

ACCORDING to the United States Consul General at Sao Paulo, Brazil, a method for disposing of some of the surplus coffee stock is suggested in the local press by which the coffee could be utilised in the extraction of caffeine and of caffeine derivatives such as chlorohydrate, citrate, and valerianate.

Pharmaceutical Exports from Switzerland.

EXPORTS of pharmaceutical products from Switzerland during the first six months of 1931 declined by nearly 10 per cent. as compared with 1930, but a slightly upward trend was noted for the spring quarter of the present year. The 1931 decline in pharmaceutical exportations from Switzerland was not as great as that suffered by most other commodities.

Influence of Light on Oxidation of Fats

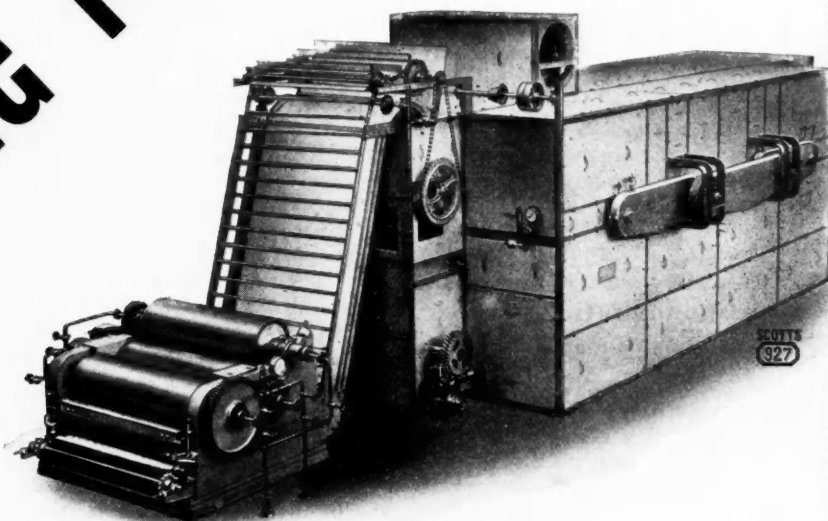
A LONG series of experiments on fats carried out by H. Colin Lea shows the influence of light on the oxidation of fats are reported in *Proceedings of the Royal Society*, Vol. 108, No. B 756. In the presence of light it has been found that oxidation has at the beginning little effect on the free acid of fats. Oxidation is appreciably accelerated by artificial light; a direct exposure of 5 minutes to the sun is sufficient to produce the beginning of rancidity; the reaction is autocatalytic and a short exposure to light accelerates subsequent oxidation. The intensity and duration of illumination greatly increase oxidation, which varies according to the temperature. The varying susceptibility to oxidation of the different samples of beef fat examined shows that this characteristic is due rather to the chemical nature of the fat than to the presence of foreign matter (non-fat). The bleaching of the yellow pigment of beef fat begins in the first stage of oxidation, and the relationship between the intensity of the Kreis Test and the quantity of active oxygen of the fat varies with the temperature. Numerous graphs and numerical data are appended to the paper.

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Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]

PARENT COAL CARBONISATION TRUST, LTD., London, E.C. (M.17/10/31.) Registered October 6, £10,000 debentures, part of £60,000; general charge. *Nil. September 2, 1930.

Satisfaction

DRUG & CHEMICAL CORPORATION, LTD., London, W. (M.S., 17/10/31.) Satisfactions registered October 1, all moneys, etc., registered February 12 and September 4, 1930.

London Gazette, &c.

Companies Winding Up Voluntarily

GLICO PETROLEUM, LTD. (C.W.U.V., 17/10/31.) By special resolution October 5. Mr. C. J. Pereira, 15 Old Jewry Chambers, London, E.C.2, appointed liquidator.

R. F. MACDONALD & CO. (CHEMICAL MANUFACTURERS), LTD. (C.W.U.V., 17/10/31.) By reason of its liabilities October 2. Mr. H. E. Garstang, 61 Brown Street, Manchester, appointed liquidator.

New Companies Registered

ELVIN BROTHERS, LTD.—Registered October 8. Nominal capital, £10,000 in £1 shares. Objects: To acquire the business of a soap maker, oil boiler and tar and rosin distiller now carried on by T. H. Elvin at Dansom Lane, Hull, as "Elvin Brothers." Directors: T. H. Elvin (chairman), 700 Holderness Road, Hull; C. Taylor and J. H. Elvin.

W. S. JENKINS & CO., LTD.—Registered October 12. Nominal capital, £750 in £1 shares. Spirit, polish and varnish manufacturers, paint, polish and varnish removers and merchants, etc. A subscriber W. Alexander, "Rosemary," Homestead Road, Chelsfield, Kent. Directors: W. S. Jenkins, F. J. Baldwin, and F. K. Humphrey.

Chemical Trade Inquiries

These inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country) except where otherwise stated.

SOUTH AFRICA.—A manufacturers' representative in Johannesburg desires to secure the representation for the Transvaal, on an indent basis, of United Kingdom manufacturers of pigments for polishes. (Ref. No. 333.)

BRITISH WEST INDIES.—A Kingston firm desires to obtain the representation, on a purchasing basis, for the Island of Jamaica, of United Kingdom manufacturers of paints (ready mixed and paste), linseed oil and zinc sheets. (Ref. No. 323.)

Industrial Gases in Denmark

THE Danish production of oxygen used in welding and cutting and that of hydrogen were 1,125,000 cubic meters valued at £31,000 and 22,000 cubic meters valued at £1,000 respectively. These figures exclude the output of the oil plants which in the case of the hydrogenation practice could be appreciable. Practically the entire production is used for home consumption. The imports of industrial gases are negligible.

Tariff Changes

BRITISH INDIA.—A Bill to enforce the duties recommended by the Indian Tariff Board's Reports on the heavy chemical industry and the magnesium chloride industry (THE CHEMICAL AGE, October 10, page 314) has now been passed. As regards copperas, however, the existing duty remains unchanged in view of the provisions of the Commercial Convention between France and India. The new duties are to be subject to the proviso that the duty levied must not in any case be less than if the articles were included in Part V of the Statutory Tariff Schedule (i.e., while the present emergency increases of Indian Customs duties are in operation the duty levied must not be less than 25 per cent. *ad valorem*). The new duties are to be effective until March 31, 1933, or, in the case of magnesium chloride, until March 31, 1939. The questions of the re-organisation of the Indian chemical industry and of the grant of a bounty to encourage the manufacture of superphosphates are to receive further consideration. In respect of magnesium chloride, the Government are empowered to increase the duty to offset any fall in import prices.

ARGENTINA.—Particulars are given below of the Decree which was issued in the Argentine on September 20, to come into force at once, increasing the Customs duties on many classes of goods on importation into the Republic.

	Duty in Pesos (gold) per kilo. Former Revised	
Oil of turpentine, all kinds	0.208	0.32
Alcohols not specially mentioned in the Tariff, except ethyl alcohols, in bottles or tins	0.96	3.20
The same, in casks or drums	0.96	1.92
Anhydrous arsenic (white arsenic)	0.16	0.24
Arsenic sulphide (red and yellow arsenic)	0.24	0.32
Crude sulphur in lumps	0.024	0.024
Sulphur in fragments, obtained by the Frash or similar systems	Not specified	0.048
Flower of sulphur and washed sulphur	Not specified	0.48
Ultramarine blue and green	0.16	0.24
Barium carbonate, chloride, hydrate and nitrate, imple	0.16	0.16
Calcium chlorides, impure	0.032	0.032
Calcium sulphate (powdered gypsum), in casks, bags or kegs	0.048	0.08
Animal, vegetable and mineral carbon, whole or powdered, for industrial use, in casks, kegs or sacks	0.08	0.16
The same, in packets	0.16	0.32
Iron acetate, pyrolignite, nitrate, carbonate, impure; ochres and earths	0.08	0.128
Impure red iron oxide (Colcotar)	0.08	0.128
Magnesium silicate (talc)	0.032	0.048
Colophony (resin pitch), dark	0.048	0.08
Bicarbonate and hydrosulphite of sodium for industrial use	0.048	0.08
Sodium compounds not specified in the Tariff	0.48	0.48

Chilean Inquiry into Cosach

Provisional President's Assurance

ACCORDING to information from Santiago de Chile Dr. Juan Esteban Montero, the provisional President of Chile, and the Minister of Finance, have joined in a statement declaring that whatever may result from the present investigation of the affairs of the Chilean Nitrate Corporation (Cosach), there will be no changes affecting the validity of the combine or its obligations and securities abroad.

In a cable to the *Chilean Review* on the same subject, Dr. Montero says "the Government must adjust itself to the legal dispositions, and in everything related to Cosach must proceed with respect for the rights of the interested parties."

